28- **Concerning the autonomic nervous system (ANS):**
a- The ratio of the number of preganglionic: postganglionic is about 20:1
b- The adrenal medulla secretes hormones with actions like those of the postganglionic nerves of sympathetic nervous system
c- The highest centre involved in the control of ANS is in the medulla
d- Transmission velocity in the postganglionic ANS fibers is the same as somatic nerves
e- The cell bodies of preganglionic fibers are present in the anterior horn of spinal cord

29- **The sympathetic division of ANS is characterized by:**
a- Adrenergic preganglionic fibers
b- The vagus nerve, which is the major component
c- Lumbo-sacral outflow of the spinal cord
d- Short postganglionic fibers
e- Thoraco-lumbar outflow of the spinal cord

30- **Parasympathetic stimulation produces:**
a- Increased cardiac contractility
b- Micturition
c- Sweating
d- Ejaculation of semen
e- Dilation of the pupil

31- **Alpha and beta receptors are:**
a- Differentiated by blockade by atropine and curare
b- Differentiated on the basis of different sensitivities to norepinephrine and nicotine
c- Adrenergic receptors
d- Cholinergic receptors
e- Found in the autonomic ganglia

32- **Sympathetic:**
a- Ganglionic transmission is mediated by acetylcholine
b- Neuromuscular transmission at the heart is mediated by adrenaline
c- Neuromuscular transmission in skin arterioles is mediated by acetylcholine
d- Neuromuscular transmission at sweat glands is mediated by noradrenaline
e- Neuromuscular transmission at the iris is mediated by dopamine

33- **Increased activity of the sympathetic nerves to the thoracic viscera produces:**
a- An increase in the coronary blood flow
b- Inhibition of atrial properties
c. Decrease in the oxygen consumption of the heart
d. Vasodilation of pulmonary vessels
e- Bronchoconstriction

34- **As regard the parasympathetic supply to the head and neck:**
a- Preganglionic fibers are provided through the vagus and facial nerves
b- Postganglionic fibers dilate the pupil and prepare the eye for far vision
c- Preganglionic fibers relay in superior cervical ganglion.
d- Postganglionic fibers enter the eye as short ciliary nerves
e- Postganglionic fibers decreases salivary glands secretion and blood flow

5- **Alpha adrenergic receptor stimulation produces all the following, EXCEPT:**
a-contraction of the dilator pupillae muscle.
b-inhibition of gastro-intestinal sphincters.
c-contraction of the piloerector muscle.
d-inhibition of the gastrointestinal motility.

6- **Stimulation of the vagus nerve causes:**
a-contraction of the spleen.
b-reduction in the strength of ventricular contraction.
c-bradycardia (slowing of the heart rate).
d-dilatation of the bronchioles.

Norepinephrine:
a) is the chemical transmitter at all sympathetic postganglionic endings.
b) represent 80% of the secretion of the adrenal medulla.
c) acts equally on both α and β adrenergic receptors. more on α
d) acting on presynaptic adrenergic nerve endings to inhibit secretion of the chemical transmitter

27- Concerning the autonomic nervous system (ANS):
a- Its fibers are present in cranial nerves 5, 7, 9 and 10
b- The efferent pathway is one neuron system
c- Adrenal medulla is a modified parasympathetic ganglion
(d)- Its transmission is chemically mediated

28- Autonomic ganglia:
a- Are present inside CNS
b- Contain the mother neurons of preganglionic fibers
(c)- Are the site of relay between one preganglionic and 8-9 postganglionic fibers
d- Of the collateral type are for the relay of parasympathetic fibers only

29- Parasympathetic stimulation produces:
(a)- Constriction of bronchial tree
b- Secretion of sweat glands
c- Constriction of the pulmonary vessels
d- Dilation of the pupil

30- Acetylcholine:
a- Is secreted by all postganglionic fibers
b- Is inactivated by the enzyme monoamine oxidase
(c)- Is the chemical transmitter in all ganglia
d- All actions are blocked by atropine

31- Concerning sympathetic nervous system:
(a)- During stimulation the cerebral blood flow is increased
b- Preganglionic fibers in the greater splanchnic nerve relay in terminal ganglia
c- Noradrenaline excites α and β receptors equally
d- It is the cranio-sacral outflow of the autonomic nervous system

32- Increased activity of the vagus nerve produces:
a- An increase in the coronary blood flow
b- Inhibition of ventricular contraction
c. Increased salivary secretion.
(d)- Evacuation of the gall bladder

33- Damage to the left cervical sympathetic chain ganglia produces:
a- Increased sweat secretion on the left side of the face
(b)- Warm and red skin on the left side of the face
c- Pupillary constriction of the right eye
d- Inhibition of salivary gland secretion

34- Stimulation of the sacral autonomic supply produces:
a- Gastric HCl and pepsin secretion
b- Ejaculation of semen
c- Contraction of the wall of rectum and the internal anal sphincter
(d)- Vasodilation of the blood vessels of genital organs

35- The α- adrenergic receptors produce:
a- Vasodilation of blood vessels
(b)- Inhibition of plain muscles of intestinal wall
c- Increased cardiac activity
d- Inhibition of plain muscles of urinary bladder

36- Blockade of parasympathetic activity causes a <u>reduction</u> in:
a- The conduction velocity in the atrioventricular node
b- Strength of skeletal muscle contraction
c- The diameter of the eye pupil
(d)- Contraction of the plain smooth muscles of gastrointestinal tract

Postganglionic parasympathetic nerves:
a) arise from the brain and sacral segments of the spinal cord.
b) are myelinated .
c) are longer than preganglionic parasympathetic fibres.
(d) can lead to excessive intestinal movement if they are stimulated.

Atropine blocks the action of acetylcholine on receptors located in the following areas, EXCEPT:
a) the gastric glands secreting HCl
b) sinoatrial node .
(c) motor end plate.
d) iris.

4

15- Regarding the sympathetic division of the autonomic nervous system:
a- Acetylcholine is secreted by all sympathetic postganglionic fibers.
b- Most sympathetic preganglionic fibers secrete noradrenaline
c- In the adrenal medulla the postganglionic fibers have lost their axons
d- Sympathetic chain extends from the thoracic to the sacral regions of the spinal cord
e- Sympathetic postganglionic fibers are very short

16- The parasympathetic nervous system:
a- Preganglionic fibers are found in all cranial nerves.
b- Prepares the eye for near vision
c- Is the cranio-lumbar outflow
d- Preganglionic fibers end on long postganglionic neurons
e- Postganglionic fibers terminate on α and β receptors located in the viscera

17- Nicotinic receptors are:
a- Present at all the effector cells stimulated by postganglionic parasympathetic fibers
b- Blocked by atropine
c- Present at the parasympathetic ganglia only
d- Members of ligand-gated ion channels
e- Stimulated by large dose of nicotine

18- The vagus nerve:
a- Inhibits ventricular contraction
b- Produces vasoconstriction of pulmonary blood vessels
c- Is excitatory to both intestinal wall movements and secretion
d- Increases salivary secretion
e- Contains parasympathetic postganglionic fibers

19- Stimulation of the pelvic nerve causes:
a- Constriction of the bronchi and bronchioles
b- Relaxation of the wall of rectum and contraction of internal anal sphincter
c- Vasoconstriction of blood vessels causing erection of penis
d- Contraction of vas deferens leading to ejaculation of semen
e- Vasodilatation of the blood vessels in the external genitalia

20- Horner's syndrome:
a- Is the lesion of the sacral sympathetic chain on one side
b- Produces dilatation of the pupil on the affected side
c- Is accompanied by warm and red skin on the same side of lesion
d- Causes dropping of the upper eye lid on the opposite side.
e- Is accompanied by increased sweat secretion on the affected side

21- The sympathetic response in a "fight or flight" reaction causes a <u>decrease</u> in:
a- Arterial blood pressure
b- Diameter of the pupil
c- Resistance of the airways
d- Blood glucose concentration
e- Heart rate

1- The autonomic ganglia:
a- Contain the cell bodies of preganglionic nerve fibers
b- In the paravertebral chain relay parasympathetic fibers only
c- Of the terminal type are present midway between spinal cord and viscera
d- Are sites where 8-9 preganglionic fibers converge on one postsynaptic neuron
e- Of collateral type relay both sympathetic and parasympathetic fibers

2- Sympathetic fibers to head and neck:
a- Originate from lateral horn cells of all thoracic segments
b- Synapse with thoracic ganglia at the same spinal cord level
c- Relax the dilator pupillary muscle to increase field of vision
d- Which supply the sweat glands are cholinergic
e- Stimulate secretion of large volume of viscid salivary secretion

In Horner's syndrome there is :
a) lesion of occulomotor nerve on one side. > parasympathetic
b) dilatation of the pupil on the affected side. constriction
c) drooping of the upper eye lid on the affected side.
d) decreased salivary secretion.

7- Sympathetic stimulation to the heart results in:
a-an increase in the duration of systole.
b-an increase in the duration of diastole.
c-an increase in the activity of Ca^{2+} pump into the sarcoplasmic reticulum
d-a decrease in the affinity of troponin for calcium

8-Concerning the parasympathetic:
a-Its stimulation inhibits intestinal motility
(b)-Its stimulation increases salivary secretion
c-Its stimulation causes bronchodilation
d-Its postganglionic cell bodies are in the CNS
e-Its postganglionic cell bodies are located on skeletal muscles

9-Atropine blocks the action of acetylcholine on receptors located in the following areas, EXCEPT:
a-the gastric glands secreting HCl.
b-sinoatrial node .
(c)-motor end plate.
d-iris.

10-Norepinephrine:
a-is the chemical transmitter at all sympathetic postganglionic endings.
b-represent 80% of the secretion of the adrenal medulla.
c-acts equally on both α and β adrenergic receptors.
(d)-acting on presynaptic adrenergic nerve endings to inhibit secretion of the chemical transmitter

11-Regarding mechanism of action of adrenergic receptors:
a-Receptors produce their effect through increasing intracellular calcium
b-α2 receptors produce their effect through increasing cAMP
(c)-B2 receptors produce their effect through increasing cAMP
d-α receptors produce their effect by increasing K^+ ions

12-Which of the following is adrenergic fibers:
(a)-Most postganglionic sympathetic fibers
b-Preganglionic sympathetic fibers
c-Preganglionic fiber to adrenal medulla
d-Preganglionic parasympathetic fibers
e-Postganglionic sympathetic fibers to sweat glands

13-It is correct to say that:
a-An injection of atropine typically produces an increase in salivary flow
b-Adrenal medulla is innervated by postganglionic sympathetic neurons
c-Preganglionic parasympathetic neurones originate from the thoracic and lumbar spinal cord
d-Stimulation of postganglionic parasympathetic neurons causes release of noradrenaline
(e)-Acetylcholine stimulates the receptors of the autonomic ganglia

3- Autonomic ganglia are:
a- Present inside CNS
(b)- Distribution centers
c- 5 types
d- Site of relay between 8-9 preganglionic and one postganglionic neurons
e- Contain the cell bodies of preganglionic neurons

4- Stimulation of vagus nerve does not produce:
(a)- Increased heart rate
b- Pulmonary vasodilation
c- Increased gastric secretion
d- Contraction of the wall of the gall bladder
e- Prolongation of cardiac conduction

5- Adrenal medulla:
a- Receives preganglionic parasympathetic fibers
b- Secretes 80% norepinephrine and 20% epinephrine
(c)- Is stimulated by acetylcholine
d- Stimulation increases intestinal motility

3- **Parasympathetic fibers:**
a- Present in oculomotor nerve represent 75% of all parasympathetic fibers
b- Produce contraction of ciliary muscle to help far vision
c- To salivary glands are secretomotor and vasodilator
d- To lacrimal glands relay in Otic ganglion
e- Produce dropping of superior eye lid

4- **Sympathetic fibers to pelvic viscera:**
a- Relay in paravertebral chain
b- Produce ejaculation of semen
c- Originate from all lumbar and upper 2 sacral segments
d- Produce vasodilation of pelvic blood vessels
e- Inhibit defecation and mediate micturition

5- **Adrenal medulla:**
a- Is a modified parasympathetic ganglion
b- Is supplied by preganglionic adrenergic fibers
c- Secretes 80% norepinephrine and 20% epinephrine
d- Relays short postganglionic fibers
e- Is stimulated by acetylcholine

6- **Parasympathetic fibers to the thoracic and abdominal viscera:**
a- Dilate bronchi and bronchioles
b- Inhibit ventricular muscle contraction
c- Decrease the oxygen consumption of the heart
d- Inhibit pancreatic secretion
e- Originate from 2nd, 3rd and 4th sacral segments

7- **Acetylcholine:**
a- Is released by all sympathetic preganglionic fibers
b- Is synthesized in terminal ends of cholinergic fibers by cholinesterase enzyme
c- Is released by all sympathetic postganglionic neurons.
d- Stimulates nicotinic receptors but inhibits muscarinic receptors
e- Is rapidly destructed by monoamine oxidase located in mitochondria

8- **In low doses, nicotine:**
a- Acts directly on intestinal smooth muscle, causing it to contract
b- Increases the rate of discharge of postganglionic parasympathetic fibers
c- Decreases the release of acetylcholine in sympathetic ganglia
d- Decreases the rate of discharge of postganglionic sympathetic fibers
e- Stimulates both sympathetic and parasympathetic preganglionic fibers

18- **Adrenal medulla:**
a- Receives preganglionic parasympathetic fibers
b- Secretes 80% norepinephrine and 20% epinephrine
c- Is stimulated by acetylcholine
d- Stimulation increases intestinal motility

19- **Stimulation of the sympathetic activity in the head and neck:**
a- Induces pupillary constriction and eye accommodation for near vision.
b- Stimulates sweat glands secretions.
c- Is associated with a decrease in cerebral blood flow.
d- Increases eye lens power to see far objects

20- **The sympathetic response in a "fight or flight" reaction causes:**
a- Decreased arterial blood pressure
b- Increased diameter of the pupil
c- Decreased diameter of the airways
d- Decreased heart rate

(7)

13- Stimulation of the pelvic nerves produces:

a- Relaxation of the wall of rectum and contraction of internal anal sphincter

b- Vasoconstriction of blood vessels causing erection of penis

c- Contraction of the bladder wall and relaxation of internal urethral sphincter

d- Ejaculation of semen

14- One of the following is not supplied by autonomic nervous system:

a- Heart

b- Lungs

c- Skeletal muscles

d- Iris

15- Acetylcholine is released from all the following, except:

a- All parasympathetic preganglionic fibers

b- All parasympathetic postganglionic fibers

c- All sympathetic preganglionic fibers

d- All sympathetic postganglionic fibers

16- Stimulation of the greater splanchnic nerve produces:

a- Increased motility of the plain muscles of stomach

b- Excessive secretion of gastric juice

c- Increased blood glucose level

d- Inhibition of mictuirition

17- Generalized sympathetic activity is characterized by the following, except:

a- Dilation of the pupil

b- Decreased cardiac contractility

c- Increased sweating

d- Contraction of sphincters of gastrointestinal tract

1- As regard resting membrane potential (RMP) of a nerve fiber:

a- There is a higher concentration of K^+ outside the nerve than inside

b- The potential across a nerve fiber is largely determined by the log of the ratio of K^+ ions inside: outside

c- Is due to diffusion of intracellular proteins to outside the nerve fiber

d- If the Na^+/K^+ pump is inhibited the membrane potential falls to zero

e- Active transport of ions is the main factor which determines RMP

2- Nerve impulse:

a- Can travel in one direction only in a nerve fiber

b- Can travel in one direction only in a synapse

c- Travels with a speed that is inversely proportional to the square root of nerve fiber

d- Is conducted with a decrease in magnitude

e- Is transmitted with more energy consumption in myelinated nerves

3- Nerve action potential:

a- Occurs when its membrane potential is hyperpolarized to a critical level

b- Is associated with a transient decrease in membrane permeability to potassium

c- Is associated with a transient increase in membrane permeability to sodium

d- Has an amplitude which is directly proportional to the intensity of stimulus

e- Begins by changing the positive resting potential to a negative potential

4- As regard the nerve relative refractory period:

a- During it the nerve excitability is increased

b- A stimulus weaker than threshold is required to generate an action potential

c- It occupies all the descending limb of action potential

d- During it all voltage gated Na^+ channels are inactivated

e- During it there is a state of hyperpolarization

Local response :-

a) is a state of passive depolarization at the cathode.

b) is accompanied by increased excitability.

c) obeys all or non law.

d) can propagate and generate another local response within a distance of 3-4 cm. ( )

Compound action potential :-

a) obeys all or non law.

b) can be graded.

c) is the action potential recorded from stimulation of a single myelinated nerve fiber by supramaximal stimulus.

d) is a biphasic action potential. ( )



21- The resting membrane potential of a nerve fiber:

a- Is due mainly to the high protein content inside the nerve fiber

b- If moved to a more negative value, the nerve cell becomes more excitable

c- Is due to the great amount of K^+ inflow through inward rectifier K^+ channels

d- Falls to zero if the Na^+/K^+ pump is inhibited

e- Distributes more negative ions on inner surface of the membrane than outer surface

22- Although the equilibrium potential of Na^+ is + 60 mV, the membrane potential does not reach this value during the overshoot because:

a- The concentration gradient of Na^+ is reversed

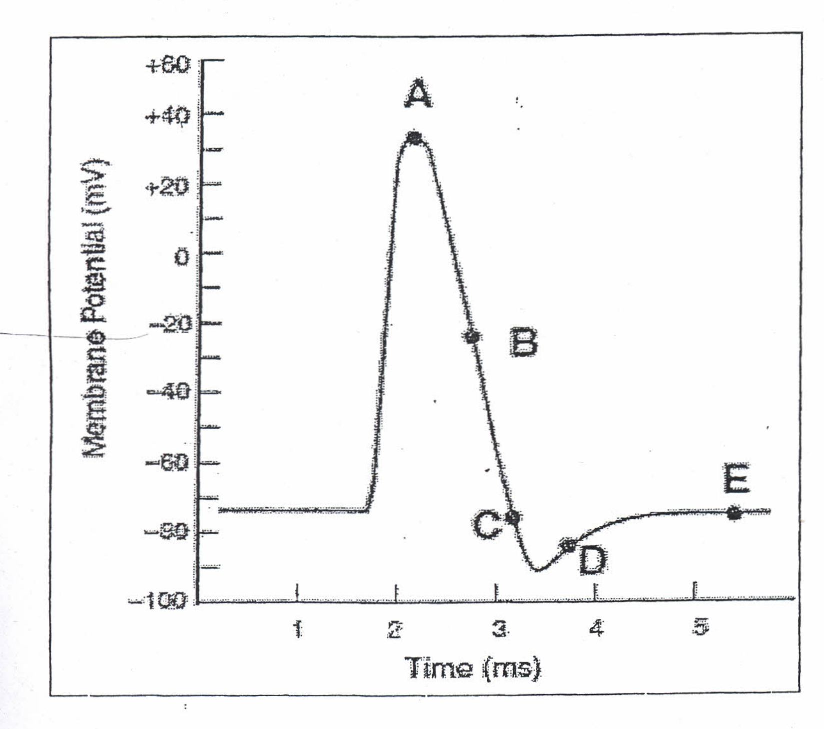
b- Na^+ channels undergo rapid inactivation

c- K^+ efflux begins immediately after the closure of the outer gates of Na^+ channels

d- The membrane is impermeable to Na^+

e- The Na^+/K^+ pump is rapidly activated

23- Regarding the nerve action potential curve below:



a- Point [A] is farthest to the Na^+ equilibrium potential

b- At point [B] the Na^+ current exceeds the K^+ current

c- The K^+ conductance between points [C] and [D] is lower than resting state

d- A stronger stimulus is needed to stimulate the nerve between points [B] and [E]

e- At point [E] the inner side of the membrane becomes positive in relation to outside

1- The resting membrane potential in nerve fibers is:

a- About -90mV in large nerve fibers

b- Due to K^+ diffusion from outside to inside the nerve fibers

c- Due to diffusion of intracellular proteins to outside the nerve fibers

d- A passive process

2- Concerning Nerve action potentials:

a- Repolarization is due to activation of Na^+ channels

b- The firing level is – 40 mV

c- Hyperpolarization is due to the slow closure of the K^+ channels

d- Depolarization is caused by increased permeability to K^+

3- Saltatory conduction:

a- Occurs in myelinated nerve fibers

b- The speed of propagation is inversely proportional to the diameter of the axon

c- The action potentials are generated at the nodes and the inter nodal spaces

d- Occurs by jumping of action potentials from one neuron to another

9

1- Concerning the strength-duration curve:

a- Within limits the stronger the stimulus the longer its duration needed to excite nerve
(b) The excitability of the nerve is inversely proportional to the chronaxie
c- Rheobase is the maximum amount of current needed to produce nerve activity
d- Utilization time is the time needed by double rheobase to give a response
e- Chronaxie is the time needed to excite a nerve by a current strength equal to the rheobase

2- All about resting membrane potential (RMP) is correct, except:

a- The inside of the membrane is negative relative to outside
b- In medium sized neurons RMP is usually about -70mV
(c) RMP is equal to the equilibrium potential of Na^+
d- The amount of K^+ outflow is much greater than amount of Na^+ inflow
e- RMP is due to unequal distribution of ions on both sides of the cell membrane

3- Concerning nerve action potential:

a- The firing level is the level at which the slow depolarization begins
b- The rapid repolarization represents 30% of the repolarization process
(c) The duration of the latent period is inversely proportionate to the speed of conduction
d- During hyperpolarization the membrane is less negative due to slow closure of K^+ channels
e- The absolute refractory period is the period from the firing level until repolarization is completed

4- The local response:

a-Is characterized by decreased excitability
b- Jumps from one node of Ranvier to the next
c- Obeys the all-or-none law
d- Is followed by an absolute refractory period
(e) Can be summated.

23-Which one of the following conditions will a decrease in the magnitude of a nerve membrane action potential?

(a) Decreasing the conductance of membrane to potassium
(b) Stimulating the nerve during the relative refractory period
c-Increasing the extracellular concentration of sodium
d-Making the membrane potential more negative
e-Increasing the magnitude of the stimulus

20- Myelination of nerve fibers:

a- Decreases velocity of nerve impulses
(b) Generates action potentials at nodes of Ranvier only
c- Increases energy requirement to maintain ion gradients
d- Increases nonselective diffusion of ions across the axon membrane
e- Increases the Na^+ permeability of the inter-nodal space

4- The chronaxie:

a- Is the threshold stimulus
b- Is twice the rheobase
(c) Can be used as a measure of excitability
d-Is the time needed to excite a nerve by a current strength equal to the rheobase

In periodic familial paralysis: → (hypokalemia = ↓K^+ in ECF)

a) nerve excitability is increased
b) nerve is depolarized.
(c) nerve is hyperpolarized.
d) acetylcholine is rapidly inactivated by choline esterase.

Motor end – plate potential is

a) reversal of charge originating through the end—plate and propagated throughout the muscle fiber

b) a local depolarization that is propagated throughout the muscle

c) a local decrease in the membrane potential that is caused by an increased permeability to Na^+ and K^+

d) a local decrease in the membrane potential that is caused by an increased permeability to Ca^{++} ( )

During an isometric contraction

a) intracellular free calcium is lower than under resting conditions

b) tropinin – bound calcium is required to maintain active tension

c) ATPase activity of the sacroplasmic reticulum is inhibited

d) the Na^+ - K^+ ATPase pump activity is inhibited ( )

Regarding skeletal muscle, the following is true, EXCEPT:

a) contraction occurs when Ca^{++} is released from the sarcoplasmic reticulum.

b) twitch tension has a time course similar to the time course of the action potential.

c) twitch tension is maximum at an initial length equal to the resting length.

d) the amount of tension generated can be altered by altering the frequency of stimulation. ( )

Prolonged duration of smooth muscle contraction compared with skeletal muscle is due to:

a) proper arrangement of actin and myosin.

b) greater amount of myosin present in smooth muscle.

c) slower uptake of Ca^{2+} ions following contraction.

d) slower cycling of myosin cross-bridges of smooth muscle ( )

The slow twitch muscle fiber differs from the fast fiber in that the former:

a) has a smaller number of muscle fibers in each motor unit

b) is more readily fatigued

c) has a higher ATPase activity

d) has a higher concentration of myoglobin and mitochondria

30- Myasthenia gravis is due to:

a- Loss of ATP

b- Decrease of acetylcholine in synaptic knobs

c- Hyperpolarization of sarcolemma.

d- Destruction of myosin heads

e- Antibodies against acetylcholine receptors in motor end plate

26-The flow of calcium into the cell is an important component of the upstroke phase of action potentials in

a-Cardiac ventricular muscle

b-Intestinal smooth muscle

c-Skeletal muscle fibers

d-Nerve cell bodies

27-The action potential of skeletal muscle

a-Has a prolonged plateau phase

b-Spreads inward to all parts of the muscle via the T tubules

c-Causes the immediate uptake of Ca^{2+} into the lateral sacs of the sarcoplasmic reticulum

d-Is longer than the action potential of cardiac muscle

e-Is not essential for contraction

28-Which of the following is correct?

a-The amplitude of AP depends on stimulus strength

b-Graded (local) potentials can only cause membrane depolarization

c-The amplitude of AP does not depend on stimulus strength

d-Salutatory conduction occurs in unmyelinated nerve fibers

e-Conduction of AP in the axon occurs only in one direction

29-It is correct to say:

a-T-tubules store Ca^{++}

b-Troponin T binds with Ca^{++}

c-Tropomyosin covers the active sites of actin

d-T-tubules do not transmit action potential to the inside of muscle fiber

e-Thick filament is composed of G actin molecules

24- Synaptic transmission at the neuromuscular junction is:
a- Decreased by the presence of high levels of cholinesterase
b- Increased by curariform drugs which bind and stimulate acetylcholine receptors
c- Depressed by abnormally low levels of magnesium
d- Depressed by increased parasympathetic nerve activity
e- Produced by increased permeability of muscle membrane to both Na^+ and Ca^{2+}

25- One of the following describes excitation-contraction coupling in skeletal muscle fibers:
a- Ca^{2+} binds to tropomyosin, causing troponin to uncover the binding sites on actin
b- The Ca^{2+} pump of the sarcoplasmic reticulum (SR) pumps Ca^{2+} into the cytoplasm
c- Depolarization of the T-tubules results in the release of calcium from the SR
d- For detachment to occur ADP and inorganic phosphate attach to the cross bridge
e- Ca^{2+} influx across the muscle fiber membrane causes Ca^{2+} release from the SR

26- The contractile response in skeletal muscle fiber:
a- Has maximal force when the sarcomere length is 2.2µ
b- Occurs when actin and myosin filaments shorten
c- Produces more tension when the muscle contracts isotonically than isometrically
d- Produces more work when the muscle contracts isometrically than isotonically
e- Decreases in magnitude with repeated stimulation

27- Type II muscle fibers:
a- Are rich in myoglobin
b- Have high oxidative capacity
c- Have low myosin ATPase activity
d- Are rich in glycolytic enzymes
e- Are called slow fibers

28- The latch-bridge mechanism in smooth muscle is responsible for:
a- Fast muscle twitch
b- Sustained muscle contraction
c- Excitation-contraction coupling
d- Unstable membrane potential
e- Plasticity

29- Smooth muscle fibers:
a- Have a stable resting membrane potential
b- Of the multi-unit type contract each one separately independent of the others
c- Contraction is more susceptible to fatigue than skeletal muscle fibers
d- Of the visceral type are controlled mainly by nervous control
e- Action potential is mainly dependent on Na^+ influx across membrane

30-The functions of tropomyosin in skeletal muscle include:
a-Sliding on actin to produce shortening
b-Releasing Ca^{2+} after initiation of contraction
c-Binding to myosin during contraction
d-Acting as a "relaxing protein" at rest by covering up the sites where myosin binds to actin
e-Generating ATP, which it passes to the contractile mechanism

11- A property shared by:
a- Skeletal and smooth muscle is their striated microscopic appearance
b- Skeletal and cardiac muscle is that they are paralyzed by cutting their motor nerves
c- Cardiac and visceral smooth muscle is their spontaneous activity when denervated
d- Skeletal and cardiac ventricular muscle is their unstable resting membrane potential
e- All varieties of muscle is that their contraction strength is related to extracellular Ca^{2+}

24-When comparing the contractile responses in smooth and skeletal muscle, which of of the following is most different?

a-The source of activator calcium
b-The role of calcium in initiating contraction
c-The mechanism of force generation
d-The source of energy used during contraction
e-The nature of the contraction proteins

25-The amount of force produced by a skeletal muscle can be increased by :

a-Increasing extracellular mg2
b-Decreasing extracellular mg2
c-Increasing the activity of acetylcholine esterase
d-Decreasing the interval between contractions
e-Increasing the prload beyond 2.2 um

5- Miniature endplate potential:
a- Is due to opening of a single receptor ion channel in the muscle membrane
b- Is caused by spontaneous release of a small amount of neurotransmitter
c- Produces minute repolarization of the motor end plate
d- Amplitude is directly proportional to the amount of Mg^{2+}concentration of end plate
e- Occurs mainly during muscle contraction

6- During Neuromuscular transmission:
a- After nerve impulse reaches nerve ending, the nerve permeability to Na^+ increases
b- Binding of transmitter to its receptors leads to decreased permeability of the postsynaptic membrane to anions
c- Acetylcholine activates presynaptic K^+ channels after its release
d- Binding of transmitter to its receptors, increase permeability of the membrane to both Na^+ and K^+
e- The effect of acetylcholine is maintained by the action of acetylcholine esterase

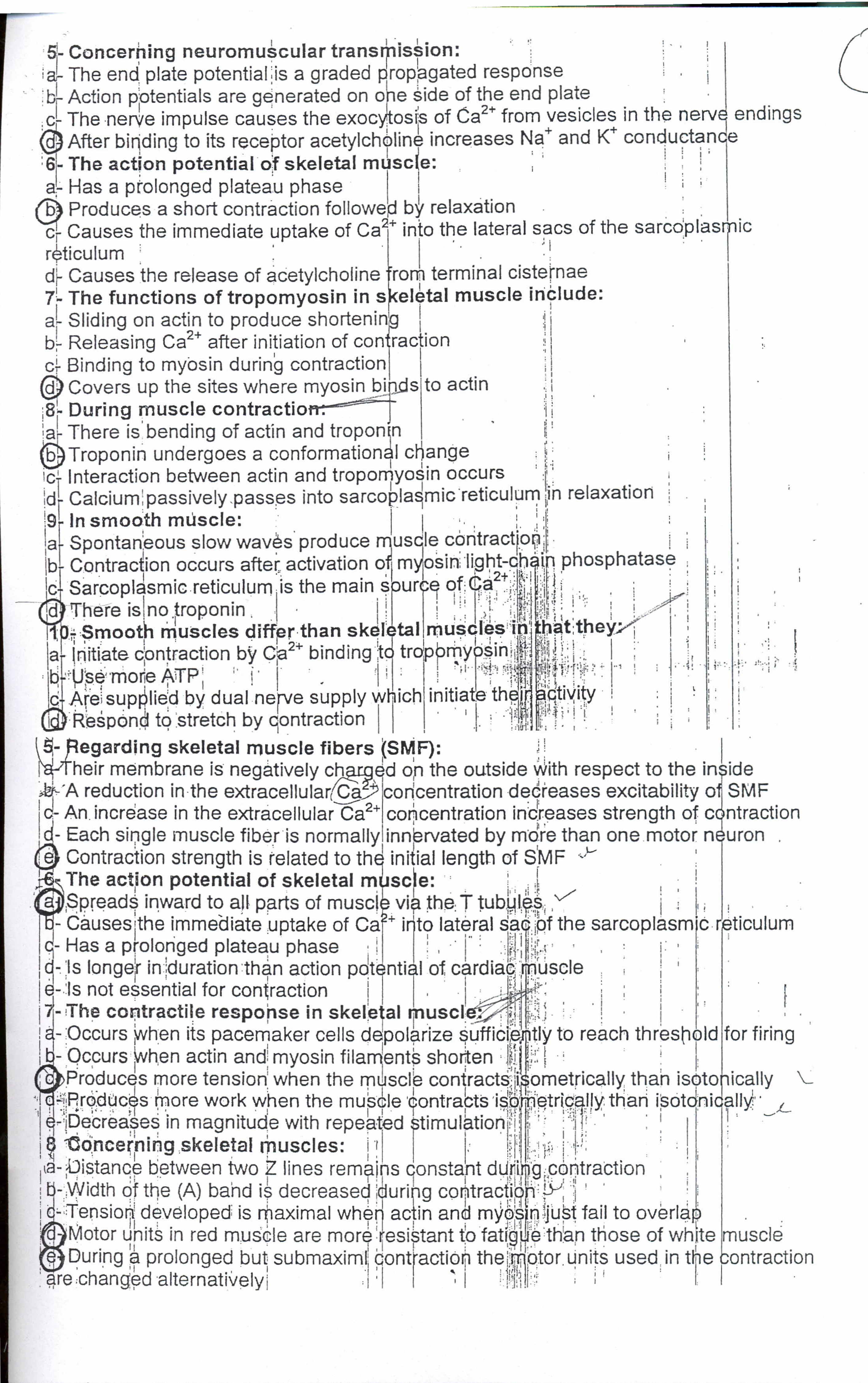
7- Regarding the excitation-contraction coupling in skeletal muscles:
a- Ca^{2+} binds to tropomyosin causing troponin to uncover myosin binding sites on actin
b- The calcium pump of the sarcoplasmic reticulum pumps Ca^{2+} back to the cytoplasm.
c- Detachment of the cross-bridge from the thin filament is a passive process
d- Once uncovered, the binding site on myosin combines with cross bridges from actin
e- Both ATP and its hydrolyzing enzyme ATPase are attached to the cross-bridge

8- Concerning smooth muscle fibers:
a- Action potential occurs due to Na^+ influx after opening of voltage gated Na^+ channels
b- Ca^{2+} /troponin complex activates myosin light chain kinase
c- Relaxation occurs when myosin light chain kinase becomes inactive
d- The duration of contraction is shorter than skeletal muscles
e- The resting membrane potential is stable and is about -50 to -60mV

9- Smooth muscles contraction is increased by all of the following, except:
a- O_2 lack
b- Alkalies
c- Stretch
d- Excess K^+
e- Cold

10- Visceral smooth muscle fibers are characterized by:
a- Formed of separate muscle fibers with completely separate cell membranes
b- Each fibers contracts independently of the others.
c- Their contraction depends on binding of Ca^{2+} with calmodulin
d- Controlled mainly by nervous control
e- Action potential is mainly absent

35- The force of contraction of a skeletal muscle can be increased by:
a) Increasing frequency of stimulation of the muscle
b. Decreasing the strength of the stimulus
c. Increasing the activity of acetylcholine esterase
d. Increasing the afterload
e. Increasing the preload above 2.2 μm



5- Concerning neuromuscular transmission:
a- The end plate potential is a graded propagated response
b- Action potentials are generated on one side of the end plate
c- The nerve impulse causes the exocytosis of Ca^{2+} from vesicles in the nerve endings
d- After binding to its receptor acetylcholine increases Na^+ and K^+ conductance

6- The action potential of skeletal muscle:
a- Has a prolonged plateau phase
b- Produces a short contraction followed by relaxation
c- Causes the immediate uptake of Ca^{2+} into the lateral sacs of the sarcoplasmic reticulum
d- Causes the release of acetylcholine from terminal cisternae

7- The functions of tropomyosin in skeletal muscle include:
a- Sliding on actin to produce shortening
b- Releasing Ca^{2+} after initiation of contraction
c- Binding to myosin during contraction
d- Covers up the sites where myosin binds to actin

8- During muscle contraction:
a- There is bending of actin and troponin
b- Troponin undergoes a conformational change
c- Interaction between actin and tropomyosin occurs
d- Calcium passively passes into sarcoplasmic reticulum in relaxation

9- In smooth muscle:
a- Spontaneous slow waves produce muscle contraction
b- Contraction occurs after activation of myosin light-chain phosphatase
c- Sarcoplasmic reticulum is the main source of Ca^{2+}
d- There is no troponin

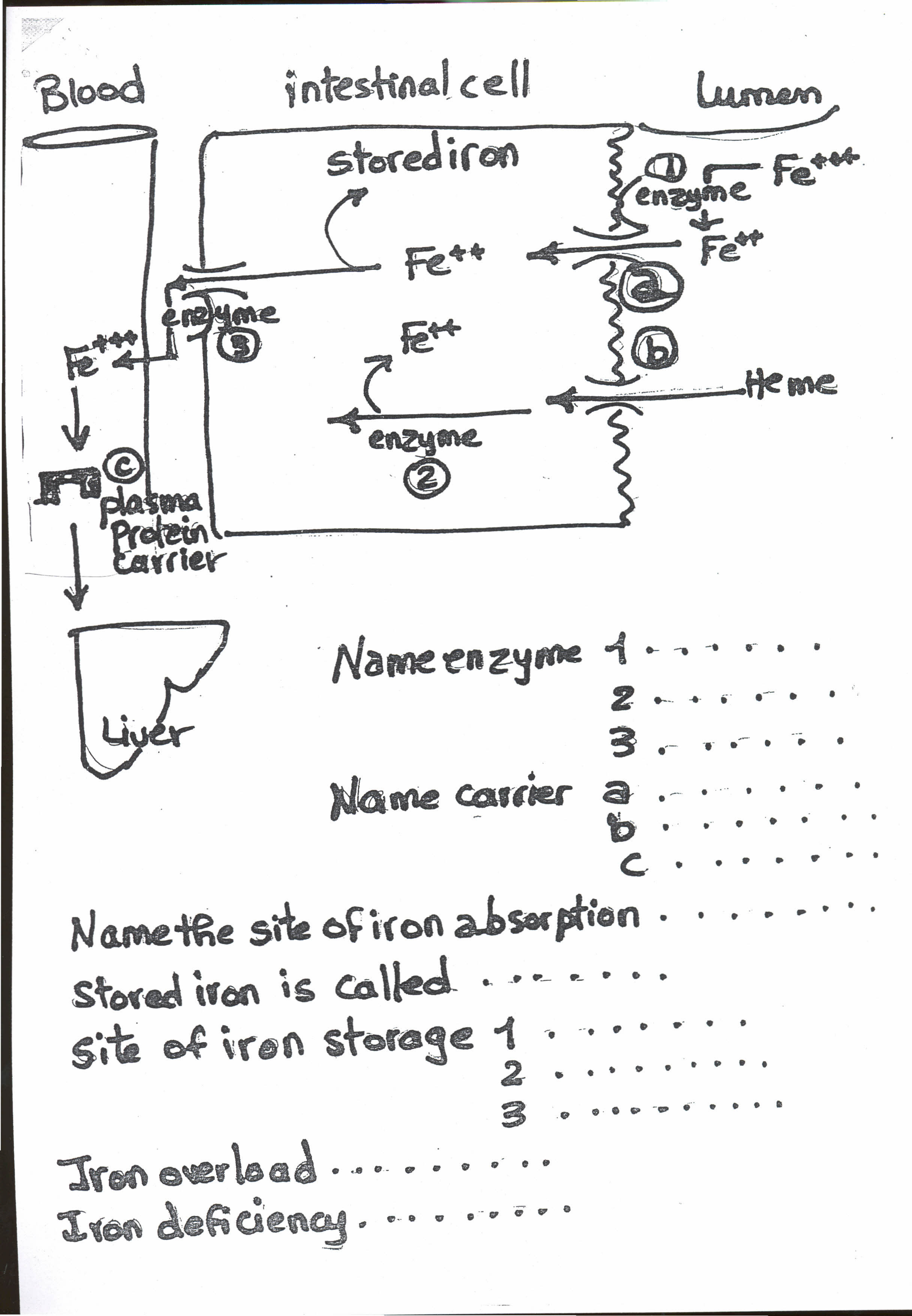
10- Smooth muscles differ than skeletal muscles in that they:
a- Initiate contraction by Ca^{2+} binding to tropomyosin
b- Use more ATP
c- Are supplied by dual nerve supply which initiate their activity
d- Respond to stretch by contraction

5- Regarding skeletal muscle fibers (SMF):
a- Their membrane is negatively charged on the outside with respect to the inside
b- A reduction in the extracellular Ca^{2+} concentration decreases excitability of SMF
c- An increase in the extracellular Ca^{2+} concentration increases strength of contraction
d- Each single muscle fiber is normally innervated by more than one motor neuron
e- Contraction strength is related to the initial length of SMF

6- The action potential of skeletal muscle:
a- Spreads inward to all parts of muscle via the T tubules
b- Causes the immediate uptake of Ca^{2+} into lateral sac of the sarcoplasmic reticulum
c- Has a prolonged plateau phase
d- Is longer in duration than action potential of cardiac muscle
e- Is not essential for contraction

7- The contractile response in skeletal muscle:
a- Occurs when its pacemaker cells depolarize sufficiently to reach threshold for firing
b- Occurs when actin and myosin filaments shorten
c- Produces more tension when the muscle contracts isometrically than isotonically
d- Produces more work when the muscle contracts isometrically than isotonically
e- Decreases in magnitude with repeated stimulation

8 Concerning skeletal muscles:
a- Distance between two Z lines remains constant during contraction
b- Width of the (A) band is decreased during contraction
c- Tension developed is maximal when actin and myosin just fail to overlap
d- Motor units in red muscle are more resistant to fatigue than those of white muscle
e- During a prolonged but submaximl contraction the motor units used in the contraction are changed alternatively


Blood
intestinal cell
Lumen
stored iron
1
enzyme
Fe+++
Fe++
Fe++
a
b
Heme
Fe++
enzyme
2
enzyme
3
Fe+++
c
plasma
Protein
Carrier
Liver
Name enzyme 1 ....
2 ....
3 ....
Name carrier a ....
b ....
c ....
Name the site of iron absorption ....
Stored iron is called ....
site of iron storage 1 ....
2 ....
3 ....
Iron overload ....
Iron deficiency ....

36- Oncotic pressure:
a- Is colloidal pressure of plasma proteins mainly globulins
b- Normally prevents edema
c- Cause osmosis of water outward through capillary from intravascular to extravascular
d- Is about 25 mmHg at arterial end and 10 mmHg at venous end of capillary
e- Increases in liver diseases

37- Albumin:
a- Has the smallest molecular weight of all plasma proteins.
b- Has smallest concentration of all plasma proteins.
c- Is responsible for the normal viscosity of blood
d- Is normally positively charged in plasma
e- Is formed mainly by plasma cells

38- Erythrocytes:
a- Are rigid biconcave discs
b- Release erythropoietin after hemolysis to stimulate the production of more red cells
c- Count is higher in newly born infants
d- Contain carbonic anhydrase enzyme needed for transport of oxygen
e- Make a major contribution to the protective capacity of blood

39- Concerning Hemoglobin:
a- Each molecule can carry 8 molecules of oxygen.
a- Binds oxygen tightly
b- Forms oxyhemoglobin with carbon monoxide
d- Contains iron in the ferrous state.
e- Oxyhemoglobin is a better buffer that deoxyhemoglobin

40- Regarding erythropoiesis:
a- It occurs in the bone marrow of all bones after age of 40
b- Erythropoietin acts through receptors on committed stem cells
c- Beta adrenergic receptors blockers stimulate erythropoietin secretion
d- Iron absorption occurs via a basolateral membrane transporter called DMT1 (luminal)
e- Vitamin B_{12} absorption occurs mainly in the duodenum and upper jejunum

41- Platelets:
a- Synthesize ADP which produces vasoconstriction
b- Granules contain Von-Willebrand factor needed for platelet survival in circulation
c- Aggregation is a self- propagating process which is stimulated by serotonin
d- Release and aggregation are inhibited by prostacyclin
e- Synthesize the protein thromboxane A_2 which stimulates adenylate cyclase enzyme

42- Proteins produced by platelets include:
a- Plasminogen
b- ~~Fibrinogen~~
c- Prothrombin
d- Thromboplastin
e- ~~Albumin~~

43- Factor VIII:
a- Acts a cofactor to increase proteolytic efficiency of IXa and Xa
b- Deficiency occurs in vitamin K deficiency
c- Is stable on storage of blood
d- Deficiency affects the extrinsic rather than intrinsic pathway for blood coagulation
e- Is present on serum

44- Regarding blood coagulation:
a- Extrinsic pathway activation follows contact of blood with collagen
b- It results from conversion of thrombin to prothrombin
c- Intrinsic pathway occurs in vivo only
d- Thrombin catalyzes the conversion of fibrinogen to fibrin
e- Intrinsic pathway is initiated by release of tissue thromboplastin

46- Neutrophils:
a- Constitute 20-30% of total leukocytes
b- Are weak phagocytic cells not weak
c- Are precursors of tissue macrophages
d- Constitute the first line of defense against invading organisms (2nd)

45- Blood clotting is delayed or prevented in vitro by all the following, except:
a- Sodium citrate
b- Heparin
ⓒ Dicumarol
d- Placing blood in non-wettable coated silicone tubes
e- Oxalate ions
46- Concerning white blood cells:
a- Neutrophils have granules that contain heparin and histamine
b- Monocytes lose their nucleus and lysosomes and change to tissue macrophages
c- Eosinophils are strong phagocytic cells
ⓓ Basophils are similar to mast cells
e- Lymphocytes contain granules filled with proteolytic enzymes
37- Concerning plasma proteins:
a- Albumin has the largest molecular weight
b- All globulins are formed by the liver
ⓒ Fibrinogen is responsible of blood viscosity
d- At normal plasma pH plasma proteins are positively charged
38- Concerning plasma:
a- Oncotic pressure is 5000 mmHg. (pl. ptn) = 28
b- It is the fluid part of blood that constitutes about 45% of total blood volume
c- Globulins are responsible for most of the plasma colloidal osmotic pressure
ⓓ It differs from serum in that serum contains no fibrinogen
39- Erythropoietin hormone is:
a- Secreted by red bone marrow
b- Stimulated by acidosis at high altitude
c- Secreted 85% from the liver and 15% from the bone marrow
ⓓ Inhibited by adenosine antagonists
40- Iron:
a- Deficiency is more common in males than in females
b- Is absorbed by active process which needs vitamin K
ⓒ Absorption is inhibited by phytic acid
d- Is stored mainly as myoglobin in the muscles
41- Vitamin B_{12}:
ⓐ Is needed for myelination of nerves
b- Needs extrinsic factor for its absorption
c- Deficiency produces microcytic anemia
d- Is stored in the bone marrow
42- The extrinsic pathway of coagulation:
a- Is initiated by contact of blood with a negatively charged surface
b- Can occur both in vivo and in vitro
ⓒ Is initiated by the release of tissue thromboplastin
d- Can occur in the absence of calcium
43- Protein C:
a- Decreases the formation of plasmin
ⓑ Is activated by thrombomodulin-thrombin complex
c- In its activated form degrades factor VII
d- Inactivates the tissue plasminogen activator
44-Concerning platelets:
a- Activation depends on Von-Willebrand factor and collagen
ⓑ Release is Ca^{2+} dependent
c- Adhesion is enhanced by ADP and thrombin
d- Aggregation and release are stimulated by prostacyclin
45- Thromboxane A_2:
ⓐ Causes platelet aggregation
b- Is metabolized to prostacyclin
c- Converts prothrombin to thrombin
d- Is released by erythrocytes

22- Concerning plasma proteins:
a- Plasma proteins concentration is 7.4mg/100ml blood
b- Alpha globulins are formed by the plasma cells
c- Albumin-globulin ratio is increased in liver disease
d- At normal plasma pH the plasma proteins are negatively charged
e- Prothrombin contributes mainly to viscosity of blood due to its elongated shape

23- Hemoglobin (Hb):
a- Of adult type contains 2 alpha and 2 delta chains and constitutes 98% of Hb in adults
b- Combines with CO_2 to form carboxyhemoglobin
c- Of fetus has more affinity to O_2 than that of adult
d- Is oxidized by carbon monoxide to methemoglobin
e- Abnormal polypeptide chains produce thalassemia

24- Red blood cells (RBCs):
a- Formation occurs in the liver during the first 5 years of life
b- Volume: total blood volume ratio is increased at high altitude
c- Have a life span of about 120 days after that they rupture in the bone marrow
d- Are biconcave rigid non nucleated discs
e- Membrane keeps hemoglobin inside to prevent decreased heart load

25- Erythropoietin hormone:
a- Formation is affected mainly by liver disease
b- Is stimulated by estrogen hormone
c- Stimulates uncommitted stem cell development to proerythroblast Committed
d- Secretion is regulated by degree of tissue oxygenation
e- Secretion is stimulated by adenosine and β- blockers

26- Hepcidin:
a- Stimulates formation of ferroportin molecules in macrophages
b- Secretion is stimulated by hypoxia
c- Secretion is inhibited by inflammation
d- Inhibits the release of recycled iron from macrophage
e- Is a hormone secreted by the enterocyte to regulate iron intestinal absorption

27- Platelets:
a- Are small granulated nucleated bodies.
b- Contain dense and beta granules
c- Are site for activation of coagulation factors
d- Are activated by adhesion to normal endothelium
e- Can synthesize prostacyclin.

28- Intrinsic pathway of coagulation:
a- Begins with activation of factor XI XII
b- Need Ca^{2+} ions in the first two reactions only
c- Produces thrombin rapidly
d- Is activated by active factor VII from extrinsic pathway
e- Needs a tissue factor

29- Concerning Anticlotting mechanisms:
a- Heparin inhibits the activity of IXa, Xa, XIa and XIIa
b- Antithrombin III inhibits active forms of factors VIII, IX, X and XI
c- Smooth vascular endothelium inactivates some activated clotting factors
d- Plasminogen changes fibrinogen to its degradation products Plasmin
e- Thrombomodulin-thrombin complex activates protein S

30- Immunoglobulin G:
a- Is produced in large amounts during the primary immune response
b- Includes ABO group antibodies
c- Is present as an antigen receptor on B lymphocytes
d- Is responsible for the passive immunity given to the fetus from mother
e- Has the largest molecular weight

Regarding T-cytotoxic (T_c) cells, the followings are true, EXCEPT:
a) contain CD8 that helps the interaction between T-cells and APC
b) recognize the antigen accompanied by MHC-II MHC I
c) cause lysis of the malignant cells by secreting perforins.
d) are responsible for rejection of transplants of foreign tissues.

15-At physiological PH, plasma proteins:
(a) Are anions.
b-Move towards the cathode during electrophoresis.
c-Are only found in the vascular space.
d-Are all globulins.

16-Incompatible blood transfusion results in all the following, EXCEPT:
a-joint pain due to capillary blockage .
(b) cardiac arrhythmia due to hypercal hyperkalemia not hypercalcemia
c-hypotension and shock due to release of vasodilators from agglutinated RBCs.
d)renal failure due to blockage of the renal tubules by agglutinated RBCs.

17-The hormone erythropoietin:
a-increases the life span of erythrocytes.
b-acts on reticulocytes to convert them to erythrocytes.
c-regulates the production of erythrocytes, thrombocytes and granulocytes.
(d) stimulates the maturation of stem cells to proerythroblast.

18-Vitamin K deficiency :
a-may be caused by its lack in diet.
(b) occurs in obstructive jaundice .
c-results in deficiency of fibrinogen .
d-is accompanied by prolonged bleeding time .

19-A blood count of a man aged 50 years gave the following picture : Hb 12gm/dL , RBCs 3 millions/ mm^3 and MCV of 97 μ^3. The following statement about the findings is true:
a-the findings are typical of one living at high altitudes .
(b) the finding are typical of vitamin B_{12} deficiency .
c-the finding are typical of iron deficiency anemia .
d-the blood would carry about 10 ml O_2 / dL blood .

20-Which of the following is correct?
a-WBC count in adult male is 5 million per mm^3
b-Normal Hb concentration in females is 10 grams%
c-In polycythemia the hematocrit decreases
→ d-Antithrombin III is an anticoagulant
→ e-Basophils secrete (release) histamine, heparin, and serotonin

21-Which of the following is correct? PL
a-The release of tissue factor III occurs in the intrinsic pathway of blood coagulation
(b) Hemophilia is a bleeding disorder caused by deficiency of factor VIII
c-The primary response (antibody response) is more potent than the secondary response
d-The primary response (antibody response) is more rapid than the secondary response
e-Both primary and secondary responses occur upon the exposure to antigen

22-Which of the following is correct?
a-Protein C is a clotting factor
b-Fibrin threads are soluble
c-Plasma cells originate from T lymphocytes
d-Immunoglobulins are produced by T lymphocyte
(e) The clotting factor prothrombin activator is an enzyme

14- Regarding erythrocyte production, all the following statements are true, Except:
(a) It takes place normally in the bone marrow of long bones during adult life.
b-May be reduced in chronic renal failure.
c-May slow down following gastrectomy.
d-May be stimulated by reduction in arterial O_2 content.

2-Concerning plasma proteins:
a- Globulins are responsible for the osmotic function
b- The oncotic pressure is 5000 mmHg
(c) Albumin has the highest concentration
d- Fibrinogen has the smallest molecular weight
e- Prothrombin has a transport function

15- Which of the following clotting factors is not vitamin K dependent?

a- Factor II
b- Factor V
c- Factor VII
d- Factor IX
e- Factor X

16- Platelets:

a- Are activated by adhesion to vascular endothelial surface
b- Can synthesize prostacyclin
c- Release is calcium-independent
d- Contain receptors for von-Willebrand factor and collagen
e- Release serotonin which decreases level of cAMP in the cytoplasm

17- Regarding blood coagulation:

a- Extrinsic pathway is initiated by contact of blood with a negatively charged surface
b- Intrinsic pathway needs calcium in the first 2 steps only
c- Extrinsic pathway is more rapid than the intrinsic pathway
d- Prothrombin catalyzes conversion of fibrinogen to its degradation products
e- Intrinsic pathway is initiated by the release of tissue thromboplastin

18- Concerning the Fibrinolytic system:

a- Activated protein C inactivates factor V and VII
b- Thrombomodulin is produced by vascular endothelium
c- The thrombomodulin- prothrombin complex activates protein C
d- Activated protein C inactivates the tissue plasminogen activator
e- Protein S functions as a cofactor to thrombomodulin

19- Following activation of basophils there is:

a- Decreased diapedesis of neutrophils
b- Decreased amoeboid movement
c- Contraction of blood vessels
d- Increased capillary permeability
e- Increased activity of factor XIa

- Stomach plays an important role in erythropoiesis because it:

a- Helps absorption of folic acid
b- Helps absorption of B_{12} and iron
c- Secretes erythropoietin
d- Forms globin part of hemoglobin

- Vitamin B_{12}:

a- Deficiency produces normocytic anemia.
b- Needs gastric HCl for its absorption
c- Is absorbed from the upper part of the small intestine
d- Is needed for nuclear maturation and cell division.
e- Is stored in the bone marrow

- The final reaction in the formation of a blood clot:

a- The formation of prothrombin activator
b- Thrombin converts fibrinogen to fibrin
c- Prothrombin activator converts prothrombin to thrombin
d- Hageman factor activates prothrombin

20- The correct sequence of activation of extrinsic pathway of blood coagulation is:

a- Tissue thromboplastin activates factor VIII
b- Calcium ions activates factor VII
c- Tissue thromboplastin activates factor VII
d- Tissue thromboplastin activates factor IX
e- Collagen fibers activate factor XII

9- Concerning plasma proteins:

a- All types are formed in the liver except β-globulins are formed in plasma cells
b- Albumin/ globulin ratio is increased in patients with liver disease
c- Albumin is mainly responsible for osmotic function due to its large molecular weight
d- Globulins are negatively charged at normal plasma pH
e- Fibrinogen is responsible for the transport function due to its elongated shape

10- Erythropoietin hormone:

a- Secretion is inhibited by adenosine antagonists
b- Is formed mainly by the spleen during the fetal life
c- Secretion is stimulated by acidosis that develops at high altitude
d- Is secreted 85% from the liver and 15% from the bone marrow in adults
e- Secretion is stimulated by estrogen hormone and cobalt salts

11- Erythrocytes:

a- Have the same concentration of sodium as in plasma
b- Biconcave shape is important to facilitate their rupture in narrow capillaries
c- Have a kidney-shaped nucleus
d- Life span is about 30 days after release into the blood
e- Count is inversely proportional with age

12- Hemoglobin:

a- Affinity to carbon dioxide is 200 times its affinity to oxygen
b- Binds oxygen tightly
c- With absent or decreased chains produces thalassemia
d- Contains iron in the ferric state.
e- Buffering action is better performed by oxyhemoglobin than deoxyhemoglobin

13- Vitamin B_{12}:

a- Deficiency results in production of red blood cells smaller than normal
b- Stimulates nuclear maturation through Inhibition of thymidine triphosphate formation
c- Needs intrinsic factor for its absorption from the upper part of the small intestine
d- Defective absorption occurs in pancreatic diseases
e- Is stored in the bone marrow

14- Platelet aggregation is inhibited by:

a- Prostacyclin
b- Thromboxane A_2
c- ADP
d- Thrombin
e- Epinephrine

Deficiency of coagulation factor number VIII :

a) is due to an abnormal gene on the Y chromosome. X
b) increases the bleeding time. coagulation
c) affects the intrinsic, rather than the extrinsic pathway for blood coagulation.
d) causes thrombocytopenic purpura. X

The hormone erythropoietin:

a) increases the life span of erythrocytes
b) acts on reticulocytes to convert them to erythrocytes.
c) regulates the production of erythrocytes, thrombocytes and granulocytes..
d) stimulates the maturation of stem cells to proerythroblast.

Immunoglobulin M :

a) is produced in large amounts in the primary immune response .
b) has the highest concentration in the plasma . IgG
c) includes Rh antibodies X IgG
d) can cross the placenta X cannot

20

1- One of the following is not a function of plasma protein:
a- Transport of hormones
(b) Stimulation of erythropoiesis
c- Buffering of blood
d- Blood clotting

2-Concerning plasma proteins:
a- Globulins are responsible for the osmotic function
b- Are formed by the bone marrow
(c) Albumin has the highest concentration
d- Prothrombin has a defensive function

3- Concerning erythropoiesis all is correct, except:
a- Is decreased after bone marrow depression
b- Needs healthy liver for formation of globin
(c) Needs healthy kidney for formation of 15% of erythropoietin
d- Needs vitamin B_{12} for maturation of RBC

4- Iron:
a- Is absorbed as ferrous (Fe^{2+}) iron by a passive process
b- Is absorbed from the stomach
(c) Is stored in the liver
d- Needed for the formation of the globin part of haemoglobin

5- The correct sequence of activation of extrinsic pathway of blood coagulation is:
a- Tissue thromboplastin activates factor VIII
b- Calcium ions activates factor VII
(c) Tissue thromboplastin activates factor VII
d- Collagen fibers activate factor XII

6- Concerning the synthesis of plasma proteins:
a- All types are formed by the liver only
b- Albumin, globulins and 50% of fibrinogen are formed by the liver
(c) Gamma globulins are formed by plasma cells in the lymphoid organs
d- Gamma globulins are released from activated T-lymphocytes

7- Concerning the osmotic pressure of plasma:
a- The total osmotic pressure of plasma is similar to that of 0.9% glucose
b- The total osmotic pressure of plasma is largely due to the contribution of plasma proteins
(c) The colloidal osmotic pressure of plasma is about 28mmHg
d- The colloidal osmotic pressure of plasma favours the filtration of fluid outside capillaries

8- Erythropoietin:
a- Is secreted by red bone marrow
b- Is a component of hemoglobin
c- Is secreted 85% from the liver and 15% from the bone marrow
(d) Is elevated in alkalosis

9- Stomach plays important role in erythropoiesis because it:
a- Helps absorption of folic acid
(b) Helps absorption of B12 and iron
c- Secretes erythropoietin
d- Forms globin part of haemoglobin

10- All the following about hemoglobin is correct, except:
a- It carries oxygen from the lungs to transport it to the tissues
b- It contains 4 atoms of iron in the ferrous state
c- Globin consists of 4 polypeptide chains
(d) After it combines with oxygen molecules the iron changes to ferric state

6- Concerning erythropoiesis all is correct, except:
a Is decreased after bone marrow depression
b- Needs healthy liver for formation of globin
(c) Needs healthy kidney for formation of 15% of erythropoietin
d- Is stimulated by testosterone hormone
e- Increases in response to hypoxia

For each blood coagulation related disorder below, select the most suitable description of a case: (Use each item once)

a- Consumption of many clotting factors
b- Deficiency of factor VIII
c- Increased fibrinogen level
d- Deficiency of prothrombin
e- Excessive heparin administration
f- Vitamin K deficiency
g- Low platelets count below 50,000/mm^3
h- Deficiency of factor XI

1- A 15-year-old child with diffuse purpura (pin-head areas of hemorrhage). Laboratory tests showed prolonged bleeding time

2- A 50-year-old man who is receiving an anticoagulant therapy (warfarin, a vitamin K competitor). He is admitted to hospital complaining of hematuria (blood in urine)

3- A 10-year-old child with hemophilia A complains of persistent bleeding after tooth extraction and has prolonged coagulation time

4- A 30-year-old pregnant female who stopped feeling the movements of her baby for several weeks. She was admitted to the hospital with bleeding tendency and examination revealed widespread clotting

5- A newly born infant with bleeding tendency, laboratory tests showed deficiency of factors II, VII, IX, X and prolonged coagulation time

Match the following components of the ventricular action potential with their characteristics:

a- The rapid depolarization and overshoot
b- The prolonged plateau
c- Absolute refractory period
d- The late rapid repolarization
e- The initial rapid repolarization
f- The resting membrane potential
g- Relative refractory period

1. During it the L-type Ca^{2+} channels are mainly operated

2. In it early premature contraction (extrasystole) can occur

3. Is established by inward rectifying K^+ channels

4. In it there is opening of the voltage gated Na^+ channels

5. During it the delayed rectifying K^+ channels are mainly operated

Match the following autonomic components with their descriptions below:

22

A- Collateral ganglia
B- Terminal ganglia
C- Paravertebral chain
D- Cholinergic fibers
E- Lesser splanchnic nerve
F- Acetylcholine
G- Noradrenaline
H- Greater splanchnic nerve
I- Vagus nerve

D 1- Include all sympathetic and parasympathetic preganglionic fibers

H 2- Stimulation produces inhibition of plain muscles of the small intestine and contraction of sphincters

I 3- Stimulation produces constriction of bronchi and bronchioles

B 4- They are sites of relay of parasympathetic fibers only

F 5- Is released by postganglionic sympathetic fibers to sweat glands

Match the following components related to neuromuscular transmission (A-H) with their functional description mentioned below (1-5). *Each option may be used once* (Each statement 1 mark)

A- Nerve action potential
B- Muscle action potential
C- End-plate potential
D- Miniature end plate potential
E- Muscarinic receptors
F- Nicotinic receptors
G- Synaptic cleft
H- Motor end plate

d 1- Occurs at rest due to spontaneous rupture of few acetylcholine vesicles

A 2- Increases membrane permeability to calcium ions

F 3- Patients with Myasthenia Gravis develop antibodies against it

C 4- Is a graded non propagated state of depolarization

G 5- Contains enzymes that prevent multiple muscle contractions

Section [B]: Matching items question:

Options:

A. β_1- adrenergic receptors
B. β_2- adrenergic receptors
C. α- adrenergic receptors
D. muscarinic receptors
E. adrenal medulla
F. adrenal cortical cells

For each of the descriptions below choose the most appropriate option from the list above. Each option may be used once, more than once or not at all.

1- slow heart when activated (D)
2- cause vasoconstriction when activated (C)
3- cause bronchodilatation when activated (B)
4- increase cardiac contractility when activated (A)
5- lead to accommodation for near vision when activated (D)

A male patient aged 70 years, suffered from fracture neck femur of the left side. He was operated for the fracture. After the operation, he was unable to move even in bed although he was encouraged to move. Three days after the operation, the doctor observed swelling in his left leg and was diagnosed as deep venous thrombosis

1-Mention two causes of occurrence of deep venous thrombosis in this patient

a-..atherosclerosis..(old..age)..................................
b-..slow.blood.flow....(bed..rest)................. sympathetic → ++ fibrinogen

2-The patient received heparin three times daily and dicumarol once daily

a-What is the mode of action of dicumarol?

..........competetive....inhibition..of..Vit.K..receptors in liver → --- 2, 7, 9, 10

b-How heparin is given

- Orally
- (•) By injection

3-After two days, heparin treatment was stopped and dicumarol treatment continues How efficacies of dicumarol treatment can is adjusted

a-By measuring bleeding time
(b)-By measuring prothrombin time
c-By measuring platelet count
d-By measuring fibrinogen level in plasma

4-Ten days later, the patient suffers from severe bleeding from a slight cut in the face. The clotting of blood doers not occur. This was diagnosed as a complication of dicumarol therapy. Choose a substance to give to the patient

a-Injection of sodium citrate
(b)-Injection of vitamin K
c-Injection of calcium chloride
d-Injection of active protein C

A 10-year-old boy has sporadic attacks of muscle paralysis. The patient has four brothers, all of whom have suffered similar symptoms. Each attack used to start with symmetrical lower limb weakness progressing to the upper limbs over a period of 3-4 hours. Spontaneous recovery occurred over 3-4 days every time. Most of the attacks started in the early morning hours without any particular precipitating factor. The patient used to have 3-4 attacks every year. Physical examination did not suggest any neurological abnormality. All investigations were normal except serum potassium level being decreased (2.2 mEq/l) during the attack and is normal after the attack. The case was diagnosed to be **familial periodic hypokalemic paralysis**. He was treated with oral potassium chloride.

31- In this patient the decrease of extracellular K^+ during the attack affects the membrane potential by:
a- Makes the equilibrium potential for K^+ more positive
b- Causes the resting membrane potential to depolarize
c- Increases the excitability of the membrane
(d)- Causes the resting membrane potential to hyperpolarize
e- Produces prolonged action potential

32- The cause of paralysis in this patient is:
a- Depolarization of membrane causes fatigue of neuromuscular junction
(b)- Decreased excitability of membrane results in no nerve impulses and paralysis
c- K^+ are needed for the release of chemical transmitter at motor end plate
d- Depolarization of membrane inhibits release of Ca^{2+} from sarcoplasmic reticulum
e- K^+ is needed to uncover binding sites on actin

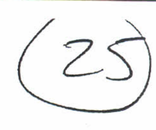
33- The main cause of nerve resting potential is:
a- Active transport of K^+ out of cell
b- Active transport of Na^+ out of cell
c- Concentration gradient for Na^+
(d)- High membrane permeability to K^+
e- High membrane permeability to Na^+

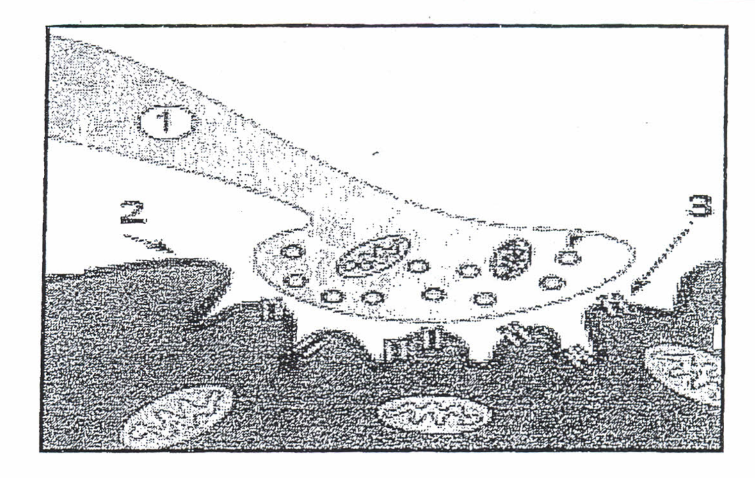
34- Membrane stabilizers:
a- Are substances that increase nerve membrane permeability to Na+
b- Include high extracellular Ca^{2+} as it produces increased membrane excitability
(c)- Are substances that decrease nerve membrane permeability to Na^+
d- Are factors which make the nerve excitability constant
e- Produce multiple action potentials with the same magnitude

9- Concerning the pacemaker potential:
a- During phase (4) an outward current is produced by the opening of funny channels
b- The depolarization (phase 0) is produced by opening of Na^+ channels
c- The resting membrane potential is -90 mV
(d)- Rate of depolarization is much slower than other cardiac cells
e- The T-type Ca^{2+} channels are stimulated when the membrane potential reaches firing level (-40mV)

47- The respiratory membrane:
a- Is about 0.7 microns in thickness
b- Is composed of about 9 million alveoli in both lungs
(c)- Is surface area is about 100 square meters.
d- Is formed of many layers of epithelial cells on the alveolar side.
e- Contains only one basement membrane, namely that of the alveolar epithelium.

11- The respiratory zone:
a- Is needed for saturation of air with water *conductive*
b- Contains type I alveolar cells which secrete surfactant *type II*
c- Warms the air to body temperature *conductive*
(d)- Engulfs minute particles by macrophages. *(alveolar macrophage)*
e- Extends from top of trachea to beginning of bronchioles *conductive*





31- The structure labeled [1]:

a- Releases chemical transmitter due to opening of voltage gated K^+ channels
b- Releases acetylcholine to act on muscarinic receptors present on muscle membrane
c- Is the motor neuron which supplies each muscle fiber by 5 axon terminals
d- Is the axon end foot which contains cholinergic nicotinic receptor vesicles
e- Is the motor nerve axon terminal which releases acetylcholine (ACh) by exocytosis

32- The extracellular space between [1] and the membrane [2]:

a- Is the space between the muscle membrane and the contractile filaments
b- Is the motor end plate containing many acetylcholine (ACh) receptors
c- Contains the basal lamina to which enzyme acetylcholine esterase is bound
d- Is the synaptic cleft containing acetylcholine-.containing vesicles
e- Contains abundant mitochondria needed for the destruction of transmitter

33- The receptors [3]:

a- Contain voltage-gated channels which increase Na^+ and K^+ conductance
b- Binding with their ligand can be competitively inhibited by curariform drugs
c- Contain ligand-gated channels with prolonged sustained action
d- Binding produces the end plate potential which is transmitted to all muscle
e- Stimulation produces action potential which is propagated in one direction only

34- A patient develops an auto-immune disease with the production of antibodies against his own receptors [3]. This patient:

a- Has tetanic contractions of skeletal muscles due to sustained binding of ACh
b- Has stiffness of the skeletal muscles due to defective amounts of ACh
c- Has skeletal muscle weakness due to depletion of energy stores
d- Can be treated with drugs that inactivate acetylcholine esterase
e- Can be treated by drugs that inhibit ACh release to rest the existing receptors

35- Synaptic transmission at the neuromuscular junction is:

a- Decreased by the presence of high levels of cholinesterase
b- Increased by curariform drugs which bind and stimulate acetylcholine receptors
c- Depressed by abnormally low levels of magnesium
d- Depressed by increased parasympathetic nerve activity
e- Produced by increased permeability of muscle membrane to both Na^+ and Ca^{2+}



21- The local response: a

a- Is characterized by Increased excitability
b- Jumps from one node of Ranvier to the next
c- Obeys the all-or-none law
d- Is followed by an absolute refractory period
e- Cannot be summated.

22- Regarding the nerve action potential: d

a- The firing level is the level at which some of the Na^+ activation gates start to open
b- The rapid repolarization is due to decreased K^+ permeability of membrane
c- Depolarization is due to inactivation of Na^+ and activation of K^+ channels
d- The high K^+ conductance at the end of action potential hyperpolarizes the membrane
e- The absolute refractory period is from the firing level until repolarization is completed

23- Concerning neuromuscular transmission: e

a- It is stimulated by high levels of cholinesterase
b- It is caused mainly by high K^+ influx through the muscle membrane
c- End plate potential is a local state of repolarization that is blocked by curare
d- Repeated stimulation activates cholinesterase to prevent multiple contractions
e- Acetylcholine release is markedly decreased by excess Mg^{2+}

24- The role of Ca^{2+} in the control of skeletal muscle contraction involves which of the following statements: a

a- Binding of Ca^{2+} to troponin removes the inhibition of actin-myosin interaction
b- Binding of Ca^{2+} to myosin activates the enzymatic activity of the myosin molecule
c- Calcium ions act as an inhibitor of the interaction of thick and thin filaments
d- Binding of Ca^{2+} to tropomyosin causes bending of the cross bridges
e- Binding of Ca^{2+} to tropomyosin returns troponin to its original conformational state

25- The normal process of relaxation in skeletal muscle depends on: c

a- A sudden reduction in the amount of ATP available for the cross bridge interactions
b- Active pumping of Ca^{2+}out of the cells when the membrane potential repolarizes
c- A rapid reuptake of Ca^{2+} into the sarcoplasmic reticulum
d- An external force to separate the interacting myofilaments
e- A high concentration of Ca^{2+} in the myofilament space to maintain muscle relaxation

26- Type I muscle fibers: b

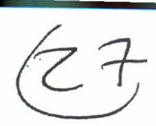
a- Are innervated by large rapidly conducting motor neurons
b- Have low myosin ATPase activity
c- Have low resistance to fatigue
d- Are rich in glycolytic enzymes
e- Have less myoglobin content

27- The neuromuscular transmission: e

a- Has end plate potential that is propagated on both directions along the muscle fiber
b- Is blocked by curare which acts by inactivating the enzyme acetylcholine esterase
c- Produces Ca^{2+}exocytosis from nerve endings vesicles after arrival of nerve impulse
d- Is markedly increased by excess Mg^{2+} due to prolonged acetylcholine release
e- Is produced by increased permeability of muscle membrane to both Na^+ and K^+

28- Visceral smooth muscle fibers: d

a- Contain no interconnecting bridges between individual muscle fibers
b- Each fiber contracts independently of the others and obeys all or none rule
c- Contraction is mainly under nervous control through supplying motor nerves
d- Respond to stretch by contraction to help evacuation of hollow organs
e- Action potential is initiated by Na^+ inflow into the cell to produce depolarization



21- Excitability of the nerve is decreased due to: b
a- Hyperkalemia
b- Local anaesthetics
c- Hypocalcemia
d- short- term blockade of Na^+-K^+ pump
e- During catelectrotonus

22- The nerve relative refractory period: c
a- Is a state of increased excitability.
b- Is a state of complete loss of excitability
c- Coincides with the lower 2/3 of descending limb of spike
d- During it all voltage gated K^+ channels are closed
e- During it all voltage gated Na^+ channels are inactivated

23- Saltatory conduction: e
a- Occurs in unmyelinated nerve fibers to conserve energy for axon
b- The speed of propagation is inversely proportional to the diameter of the axon
c- The action potentials are generated at the nodes and the inter nodal spaces
d- Occurs by jumping of action potentials from one neuron to another
e- The speed of propagation is directly proportional to the internodal distance

24- The resting membrane potential of a nerve fiber: c
a- If moved to a less negative value, the nerve cell becomes less excitable
b- Depends mainly on active pumping of Na^+ and K^+ through membrane
c- Is due to the great amount of K^+ ouflow through inward rectifier K^+ channels
d- Is mainly due to selective membrane permeability for Na^+ more than K^+ ions
e- Is caused by diffusion of intracellular proteins to the outside of the nerve fibers

25- The nerve action potential: d
a- Occurs when the membrane potential is hyperpolarized to a critical level
b- Is associated with a transient decrease in membrane permeability to potassium
c- Contains a depolarization part during which all Na^+ channels are inactivated
d- Has a hyperpolarization part which occurs due to slow closure of K^+ channels
e- Begins by changing the positive resting potential to a negative potential

26- The local response: e
a- Is characterized by depressed excitability.
b- Cannot be summated.
c- Obeys the all or none law.
d- Is followed by an absolute refractory period.
e- Is directly proportional to the magnitude of stimulus

19- Excitability of the nerve is increased due to: b
a- Hypokalemia
b- Hypocalcemia
c- Hyponatremia
d- Tetrodotoxin toxin
e- Local anaesthetics

20- The resting membrane potential of a nerve fiber: d
a- Includes all changes in membrane potential during conduction of the nerve impulse
b- If moved to a more negative value, the nerve cell becomes more excitable
c- Is due to the great amount of K^+ inflow through inward rectifier K^+ channels
d- Is due mainly to selective membrane permeability for Na^+ and K^+ ions
e- Distributes more positive ions on inner surface of the membrane than outer surface

27- As regards smooth muscles: c
a- Depolarization is caused by Na^+ entry
b- Electrical activity shows stable membrane potential
c- They need calmodulin for contraction to occur
d- Visceral smooth muscle fibers are controlled mainly by nervous control
e- Slow waves always initiate muscle contraction

29- Concerning skeletal muscle contraction: e
a- Increased stimulus strength increases contraction with same number of muscle fibers
b- Increasing frequency of stimulation decreases contraction due to Ca^{2+} exhaustion
c- Increasing the afterload increases the amount of muscle shortening
d- Maximal contraction is obtained at sarcomere length 2.2μ because preload is zero
e- Contracture occurs due to accumulation of metabolites and ATP depletion

21- During the relative refractory period of an action potential:
a- The excitability is zero
b- However strong the stimulus, it cannot produce an action potential
c- Most Na^+ channels are still inactivated and few Na^+ channels are in their resting state
d- The membrane is depolarized or in the first 1/3 of repolarization
e- K^+ channels are all closed

22- The nerve action potential:
a- Occurs when the membrane potential is hyperpolarized to a critical level
b- Repolarization phase becomes slower if Na^+ channels are kept open
c- Has a firing level which is reached at the end of the spike
d- Has an amplitude which is directly proportional to the intensity of stimulus
e- Hyperpolarization phase is due to slow closure of the inactivation gate of K^+ channels

23- Saltatory conduction in myelinated axons results from the fact that:
a- Salt concentration is increased beneath the myelin segments
b- Non-gated ion channels are present beneath the segments of myelin
c- Membrane resistance is decreased beneath the segments of myelin
d- Voltage-gated sodium channels are concentrated at the nodes of Ranvier
e- Ion permeability is decreased at the nodes of Ranvier

24- A syndrome of muscle weakness is caused by antibodies against components of voltage gated calcium channels. The interaction of the antibodies impairs ion channel opening and would likely cause:
a- Decreased nerve conduction velocity
b- Delayed repolarization of axon membranes
c- Impaired release of acetylcholine from motor nerve terminals
d- More rapid upstroke of the nerve action potential
e- Repetitive nerve firing

25- The functions of tropomyosin in skeletal muscle include:
a- Sliding on actin to produce shortening
b- Releasing Ca^{2+} after initiation of contraction
c- Binding with myosin during contraction
d- Acting as a relaxing protein at rest by covering up the myosin binding sites on actin
e- Generating ATP, which it passes to the contractile mechanism to provide energy

27- Concerning smooth muscle fibers:

a- Action potential of the multi-unit type cannot spread from one fiber to adjacent fibers
b- Ca^{2+}/troponin complex activates myosin light chain kinase
c- Visceral smooth muscle fibers are controlled mainly by nervous control
d- The duration of smooth muscle contraction is shorter than skeletal muscles
e- Slow waves can always initiate muscle contraction

20- The resting membrane potential is:

a- The recording of electrical difference between 2 points outside membrane at rest
b- Due mainly to the activity of the electrogenic Na^+/K^+ pump
c- Produced by K^+ efflux through inward rectifier channels during depolarization
d- Equal to the equilibrium potential of K^+ as calculated by Nernst equation
e- The accumulation of positive ions on the inner surface of membrane

26- The contractile response in skeletal muscles:

a- Produces more tension when the muscle contracts isometrically than isotonically
b- Includes Ca^{2+} pumping from sarcoplasmic reticulum back to the cytoplasm
c- Involves detachment of the cross-bridge from the thin filament by a passive process
d- Produces more work when the muscle contracts isometrically than isotonically
e- Decreases in magnitude with repeated stimulation

29- The respiratory membrane:

a- Surface area increases progressively with age to provide all body needs
b- Is composed of about 9 million alveoli in both lungs
c- Surface area is about 80 square meters.
d- Is formed of many layers of epithelial cells on the alveolar side.
e- Contains only one basement membrane, namely that of the alveolar epithelium.

30- The conducting zone:

a- Is the site of gas exchange
b- Warms and removes excess water from the air to avoid alveolar damage
c- Engulfs minute particles by macrophages
d- Traps particles by mucus and transports it upwards.
e- Contains a mucociliary escalator system which is stimulated by cigarette smoking

28- In sinoatrial (SA) nodal action potential:

a- β1 adrenoceptor activation increases pacemaker current (If).
b- Fast Na^+ channels are responsible for phase 0.
c- K^+ conductance is highest during phase 0.
d- Vagal stimulation increases the slope of phase 4
e- Opening of funny channels produces an outward current during phase 4



13- Vitamin B_{12}:
a- Is found mainly in green leafy vegetables
b- Is needed for the degradation of thymidine triphosphate and formation of DNA
c- Excess amounts are stored in the bone marrow as transcobalamine II
d- Deficiency produces defective myelinalion of nerves
e- Absorption is affected after gastrectomy due to absence of gastric HCl

14- A blood count in a women aged 40 gave the following picture: Hb, 11 g/dl; RBCs count, 3million/mm^3; mean red cell diameter, 8.2μm.Which of the following statements about the findings is true:
a- The blood picture is within normal limits
b- The findings are typical of iron deficiency anemia
c- The findings are typical of vitamin B_{12} deficiency
d- This blood would carry about 10 ml oxygen/dl blood
e- The findings are typical of someone living at high altitude

15- Concerning iron absorption:
a- Ferroportin (the iron import protein) transports Fe^{2+} to the inside of the enterocytes
b- Inflammation produces anemia due to degradation of ferroportin molecules
c- Hemosiderosis is produced by the excess of the heme carrier protein "hepcidin"
d- Hepcidin stimulates formation of ferroportin molecules in macrophages
e- It occurs in the lower ileum by an active process that is inhibited by phytic acid

16- Platelets:
a- Enhances vascular repair by releasing the cytokine PAF to stimulate vascular growth
b- Aggregation and release are stimulated by prostacyclin
c- Activation is enhanced by ADP and Ca^{2+}
d- Are activated by adhesion to normal endothelium
e- Aggregation is a self propagating process which involves ADP and thromboxane A_2

17- The extrinsic pathway of coagulation normally begins with:
a- Contact of blood with collagen
b- Trauma to the blood
c- Activation of platelets
d- Tissue trauma
e- Interaction between thromboxane A_2 and prostacyclin

18- Protein C:
a- Acts as a cofactor for thrombomodulin
b- Is activated by thrombomodulin-thrombin complex
c- Decreases the formation of plasmin
d- In its activated form degrades factor VII
e- Inactivates the tissue plasminogen activator

19- Concerning antibodies:
a- Immunoglobulin (Ig) G is produced in large amounts during the primary response
b- Specificity is determined by the amino acid sequence within the constant portion
c- IgE triggers the degranulation and release of basophils and mast cells
d- Rh- antibodies are example of Ig M
e- Ig D is the main antibody present in the body external secretions

9- Albumin: d

a- Behaves as a cation at normal plasma pH
b- Is rapidly filtered by the renal glomeruli due to its small molecular weight
c- Is mainly responsible for protective function of plasma proteins
d- Is important for tissue fluid formation and blood volume regulation
e- Contributes mainly to the blood viscosity due to its elongated shape

10- Erythropoietin hormone: a

a- Acts on receptors located on the committed (CFU-E) stem cells
b- Inhibits hepcidin secretion to prevent iron overload
c- Acts on mature erythrocytes to stimulate their mitosis
d- Is secreted 85% from the liver and 15% from the bone marrow in adults
e- Secretion is stimulated by adenosine antagonists

11- Concerning iron absorption: d

a- Ferroportin is the iron export protein located on the apical membrane of enterocyte
b- The plasma transport protein transferrin binds 2 iron molecules in the Fe^{2+} form
c- Oxalates increase iron absorption by forming soluble absorbable compounds with it
d- Hepcidin inhibits release of recycled iron from macrophages
e- The enterocyte mucosal block mechanism occurs by inhibition of ferroxidase enzyme

12- Vitamin B_{12}: c

a- Absorption is increased by trypsin needed for degradation of extrinsic factor
b- Compete with folic acid for same site in formation of thymidine triphosphate
c- Fails to bind its mucosal receptors at lower ileum in pernicious anemia
d- Deficiency results in production of red blood cells with lifespan longer than normal
e- Is stored in the bone marrow as transcobalamine

13- Thromboxane A_2: e

a- Is formed by thromboxane synthase present in vascular epithelium
b- Stimulates release reaction of platelets but inhibits their adhesion
c- Keeps the platelet plug localized to site of injury
d- Increases free calcium in platelets by increasing cAMP
e- Is involved in the self- propagating process of platelet aggregation

14- Which of the following coagulation factors is consumed during coagulation?b

a- Factor X
b- Factor VIII
c- Factor XI
d- Factor VII
e- Factor IX

11- Concerning plasma:

a- A/G ratio is the ratio between albumin and α- globulins
b- Plasma viscosity is 3x that of water and is due to the elongated shape of fibrinogen
c- In liver disease the level of plasma γ- globulins is markedly reduced
d- At acidic plasma pH the plasma proteins are negatively charged
e- Deficiency of albumin produces accumulation of tissue fluid

12- Which type of hemoglobin is not normally found within human erythrocytes?

a- HbA
b- HbA2
c- HbCO
d- HbO_2
e- Reduced hemoglobin (Hb)

15- Which one of the following clotting factors is vitamin K dependent? c
a- Fibrinogen
b- Factor XI
c- Factor IX
d- Plasminogen
e- Factor VIII

16- In the process of fibrinolysis: e
a- Thrombin is activated by thrombomodulin- protein S complex
b- Active protein C activates tissue plasminogen activator inhibitor
c- Thrombin and its cofactor plasmin inactivate factor V and VIII
d- Plasminogen is activated by heparin and thrombin
e- Fibrinogen degradation products inhibit thrombin

17- Blood coagulation: d
a- By extrinsic pathway occurs following contact of blood with collagen
b- By intrinsic pathway is Ca^{2+} independent except the 1^{st} two steps
c- Through the intrinsic pathway occurs in vivo only
d- Involves the conversion of fibrinogen to fibrin which is catalyzed by thrombin
e- Through the intrinsic pathway is initiated by release of tissue thromboplastin

18- Antithrombin III: b
a- Inactivates the clotting factors XIIa, XI,a, Xa, and VIIa
b- Binds serine proteases of coagulation system and blocks their activity
c- Acts by precipitation or deionization of ionized calcium
d- Binding with clotting factors is facilitated by prostacyclin
e- Inhibits formation of factor IX by competing with vitamin K in the liver

19- A 2-year- old boy bruises easily and has bleeding gums. His grandfather has a bleeding disorder. His physical examination shows several bruises on the legs. In your opinion which coagulation factor is deficient in this patient? c
a- Prothrombin activator
b- Factor II
c- Factor VIII
d- Factor X
e- Factor V

20- Concerning white blood cells: d
a- Neutrophils have granules that contain heparin and histamine
b- Monocytes lose their nucleus and lysosomes and change to tissue macrophages
c- Eosinophils kill parasites because they are strong phagocytic cells
d- Basophils are responsible for immediate-type hypersensitivity reactions
e- Lymphocytes contain granules filled with proteolytic enzymes

18- A 45-year-old man presents to the doctor with a 2- week history of severe diarrhea. His stool specimen is positive for parasitic eggs. Which type of WBCs would have an elevated number? a
a- Eosinophils
b- Neutrophils
c- Lymphocytes
d- Basophils
e- Monocytes

10- Globulins: d

a- Are formed in the liver except the β- type is formed in plasma cells
b- Are important for tissue fluid formation due to their high concentration
c- Are negatively charged and act as weak bases at normal plasma pH
d- Are essential for maintenance of normal capillary permeability
e- Of the γ-type are responsible for blood viscosity due to their elongated shape

11- Hemoglobin: b

a- Affinity to carbon dioxide is 200 times its affinity to oxygen
b- Transforms to methemoglobin when ferrous iron changes to the ferric state
c- Binds oxygen tightly to form oxyhemoglobin
d- Of the fetal type has more affinity to oxygen due to the presence of 2 F-chains
e- Buffering action is better performed by oxyhemoglobin than doxyhemoglobin

12- Hepcidin: c

a- Stimulates formation of ferroportin molecules in macrophages
b- Secretion is stimulated by hypoxia to supply increased demand for iron
c- Inhibits the release of iron from liver and other store sites
d- Synthesis is inhibited by iron loading to maintain iron homeostasis
e- Is a hormone secreted by the enterocyte to regulate iron intestinal absorption

13- Vitamin B_{12}: e

a- Absorption is decreased by trypsin which degrades intrinsic factor
b- Antagonizes the action of folic acid in the formation of thymidine triphosphate
c- Deficiency is usually due to decreased intake in diet except in vegetarians
d- Deficiency produces small cells irregular in shape due to defective maturation
e- Defective absorption occurs if an autoimmune disease affects gastric parietal cells

14- Concerning platelets: a

a- Aggregation is self-propagating process stimulated by platelet activating factor
b- Release is Ca^{2+} independent step stimulated by thromboxane A_2
c- Adhesion is enhanced by ADP and thrombin
d- Aggregation and release are stimulated by prostacyclin
e- Activation depends on Von-Willebrand factor and collagen

15- Regarding blood coagulation: d

a- Extrinsic pathway is initiated by contact of blood with a negatively charged surface
b- Intrinsic pathway needs calcium in the first 2 steps only
c- Intrinsic pathway is more rapid than the extrinsic pathway
d- Extrinsic and Intrinsic pathways are interlinked through activation of factor IX by VIIa
e- Prothrombin catalyzes conversion of fibrinogen to its degradation products

16- Regarding the fibrinolytic system: c

a- Streptokinase activates inhibitor of tissue plasminogen activator
b- Thrombomodulin- prothrombin complex inactivates factor V and VIII
c- Plasmin lyses fibrin and fibrinogen into fibrin degradation products
d- Fibrinolysin formation is stimulated by protein S and its cofactor protein C
e- Thrombomodulin is mainly produced by cerebral endothelial cells

17- The defensive function of Neutrophils is achieved by: d

a- Transforming to the phagocytic cells tissue macrophages
b- Coating bacteria to make it tasty to the phagocytes
c- Migrating into blood clots and producing fibrinolysin
d- Activation of cell membrane bound enzyme NADPH oxidase
e- Secreting immunoglobulins after recognition of antigens

9- Stimulation of the pelvic nerve causes:
a- Constriction of the bronchi and bronchioles
b- Relaxation of vas deferens leading to retention of semen
c- Vasoconstriction of blood vessels causing erection of penis
d- Contraction of the wall of rectum and relaxation of internal anal sphincter
e- Variable effects on uterine muscles depending on menstrual cycle

10- Muscarinic receptors:
a- Are found in effector cells stimulated by the preganglionic parasympathetic fibers
b- Are stimulated by muscarine small dose while inhibited by large dose
c- Present at sweat glands are stimulated by sympathetic postganglionic fibers
d- Are found in the autonomic ganglia
e- Are blocked by atropine and tetraethyl ammonium

1- Solute movement by active transport is different from facilitated carrier-mediated transport in that active transport:
a- Cannot be increased above a certain point by increasing solute concentration
b- Is inhibited by other molecules with structures similar to that of the solute
c- Moves the solute against its electrochemical gradient
d- Allows movement of water soluble molecules
e- Is mediated by specific membrane proteins

2- The sodium- potassium pump:
a- Maintains high extracellular K^+ and high intracellular Na^+
b- Is the carriage of K^+ secondary to the active transport of Na^+
c- β- subunit contains a protein channel that allows passage of hydrated ions
d- Utilizes energy for the coupling of Na^+ and K^+ with their symport carrier
e- α-subunit possesses 2 binding sites on the outer side and 3 on the inner side

Match the following components related to immunity (A- I) with their descriptions below (1-5):
A- Kupffer cells of the liver
B- Eosinophils
C- α- interferons
D- β- interferons
E- γ- interferons
F- MHC-I
G- MHC-II
H- T- cytotoxic
I- T-helper

C 1- Have antiviral actions and activate natural killer cells

I 2- Secrete interleukins and interferons to stimulate other cells in the immune system

A 3- Important phagocytic cells that act as antigen presenting cells

H 4- Are responsible for rejection of transplants of foreign tissues

F 5- Is coupled to peptide fragments generated from proteins synthesized within the cells



9- Acetylcholine: b
a- Acts on the same type of receptor on pre- and postganglionic parasympathetic fibers
b- Acts on the same type of receptor on autonomic postganglionic fibers
c- Is hydrolyzed by the same cholinesterase found in blood and neuromuscular junction
d- Acts as an inhibitory neurotransmitter
e- Is formed mainly by the dendrites of cholinergic neurons and stored in clear vesicles

3- A sodium channel that opens in response to an increase in intracellular cyclic-AMP is an example of:
a- A ligand-gated ion channel
b- An ion pump
c- Sodium-coupled solute transport
d- A channel which is opened all the time
e- Receptor-mediated endocytosis

4- The autonomic nervous system:
a- Fibers are present in cranial nerves 5, 7, 9 and 10
b- Has a modified ganglion in which the postganglionic cells have lost their axons
c- Controls the function of all types of muscles
d- Postganglionic fibers are mostly myelinated B- fibers
e- Secretes one type only of neurotransmitters by all its fibers

5- Concerning the sympathetic nervous system:
a- All postganglionic fibers release norepinephrine from their terminals
b- Preganglionic fibers arise from the lateral horn cells of thoracic and sacral spinal cord
c- Acetylcholine is released from all sympathetic preganglionic nerve terminals
d-The sympathetic chain has a ganglion for each segment of the spinal cord
e- The α and β postsynaptic receptors adjust the release of chemical transmitters

6- Impaired dilation of the pupil when entering a dark room is due to deficient functioning of:
a- Presynaptic axons that travel in the oculomotor nerve
b- Postsynaptic axons that travel in the facial nerve
c- Acetylcholine delivered by the circulatory system
d- Postsynaptic axons arising from paravertebral ganglia
e- Postsynaptic axons arising from prevertebral ganglia

7- Which statement correctly describes the relationship between preganglionic and postganglionic sympathetic axons?
a-The number of presynaptic axons is much greater than that of postsynaptic axons
b-The number of postsynaptic axons is much greater than that of presynaptic axons
c-The number of presynaptic and postsynaptic axons is equal
d- The length of presynaptic axons is much greater than that of postsynaptic axons
e- Presynaptic and postsynaptic neurons are joined by gap junctions

8- The vagus nerve:
a- Stimulates the secretion and vasodilation of the salivary glands
b- Evacuates the urinary bladder due to contraction of wall and inhibition of sphincter
c- Is excitatory to both intestinal wall plain muscles and sphincters
d- Stimulation produces a reduction in the force of ventricular contraction
e- Includes parasympathetic preganglionic fibers that relay in ganglia at effector organs

3- Parasympathetic fibers: d

a- Present in vagus nerve represent 25% of all parasympathetic fibers
b- Produce contraction of ciliary muscle to help far vision
c- Represent the cranio-lumbar outflow of autonomic nervous system
d- To salivary glands are secretomotor and vasodilator
e- Are important in emergency situations

4- Concerning autonomic ganglia: b

a- Adrenal medulla is a modified parasympathetic ganglion
b- The collateral ganglia are present midway between spinal cord and viscera
c- The paravertebral chain relays both sympathetic and parasympathetic fibers
d- The ganglia receptors are specifically blocked by atropine
e- The terminal ganglia contain presynaptic α- adrenergic receptors

5- Parasympathetic fibers to the thoracic and abdominal viscera: c

a- Inhibit gastric HCl and pepsin secretion
b- Inhibit ventricular muscle contraction
c- Produce hyperpolarization of SA node cells by increasing K^+ conductance
d- Stimulate relaxation of the internal anal sphincter
e- Are supplied by both the glossopharyngeal and vagus nerves

6- Acetylcholine: e

a- Is rapidly destructed by monoamine oxidase located in mitochondria
b- Is synthesized in terminal ends of cholinergic fibers by cholinesterase enzyme
c- Is released at the parasympathetic ganglia only
d- Action at effector organs is blocked by muscarine
e- Is released by the sympathetic nerve endings in the sweat glands

7- Injury to the lesser splanchnic nerve produces loss of: d

a- Relaxation of internal urethral sphincter
b- Erection of penis in males
c- Contraction of wall of rectum
d- Contraction of the vas deferens
e- Increased epinephrine and norepinephrine secretion

8- The alarm response causes a decrease in the: a

a- Diameter of skin blood vessels
b- Diameter of the pupil
c- Arterial blood pressure
d- Blood glucose concentration
e- Heart rate

1- The parasympathetic postganglionic fibers: b

a- Play important functions in skin and skeletal muscles
b- Relay mainly on ganglia located on or near viscera
c- Produce erection and ejaculation of semen
d- Function is important during emergency situations
e- Are more longer than the preganglionic fibers

2- Sympathetic fibers to abdominal viscera: d

a- Originate from lateral horn cells of upper 6 thoracic segments
b- Supplying the adrenal medulla secrete norepinephrine
c- Produce urine retention and decreases urine volume
d- Increase the blood glucose level by decreasing liver glycogen
e- Produce inhibition of plain muscles and sphincters of small intestine

3- Stimulation of parasympympathetic fibers to the salivary glands produces: a
a- Vasodilation and increased secretion.
b- Vasodilation and decreased secretion
c- Vasoconstriction and increased secretion
d- Vasoconstriction and decreased secretion
e- Secretion of small amount of viscous saliva.

4- The autonomic ganglia: d
a- Are the site of relay between 8-9 preganglionic and one postganglionic fibers
b- Of the terminal type are related to the sympathetic division
c- Are blocked by atropine and tetraethyl ammonium
d- Of the collateral type are present at the origin of big vessels from aorta
e- Of paravertebral type contain a ganglion for each spinal cord segment

5- Which of the following is characteristic of the parasympathetic but not of sympathetic nervous system? e
a- Modified ganglion in which the postganglionic fibers have no axons
b- Nicotinic receptors on postganglionic neurons
c- Muscarinic receptors on some target tissues
d- Cholinergic preganglionic neurons
e- About 75% of fibers run in the 10^{th} cranial nerve

6- Sympathetic fibers to the head and Neck: c
a- Relaxes ciliary muscle to increase power of lens to see far objects
b- Causes vasodilation of skin blood vessels to increase sweat secretion
c- Increase cerebral blood flow and produce mental alertness
d- Contracts muscles of lower eye lid to increase field of vision
e- Originate in the lateral horn of the first and second cervical segments

7- Injury to the lesser splanchnic nerve produces loss of: d
a- Relaxation of internal urethral sphincter
b- Erection of penis in males
c- Contraction of wall of rectum
d- Contraction of the vas deferens
e- Increased epinephrine and norepinephrine secretion

8- Muscarinic receptors are: c
a- Present at the motor end plate
b- Blocked by atropine and large doses of muscarine
c- Present in sweat glands supplied by postganglionic sympathetic fibers
d- Considered one type of adrenergic receptors
e- Auto-receptors that regulate the release of chemical transmitters

1- The autonomic nervous system: e
a- Originates from all segments of the spinal cord
b- Controls the function of the skeletal muscles
c- Preganglionic fibers synapse on cell bodies located mainly inside CNS
d- Preganglionic sympathetic fibers relay in ganglia present near or in visceral organs
e- Postganglionic parasympathetic fibers act through stimulation of muscarinic receptors

2- Sympathetic fibers to thoracic viscera: c
a- Originate from lateral horn cells of all thoracic segments
b- Increase force of ventricular contraction by decreasing c-AMP in cardiac myocytes
c- Produces vasoconstriction of pulmonary vessels
d- Produces vasoconstriction of coronary vessels
e- Prolong the duration of conduction of impulses from atria to ventricles

(1)

All of the following characteristics are associated with facilitated diffusion EXCEPT:

a. sterospecificity for the substance. ( )
b. saturation kinetics. ( )
c. needs energy in the form of ATP. (✓)
d. competitive inhibition with similar substances. ( )

- The interstitial fluid:

a. has proteins as its major anion. ( )
b. and plasma make up the internal environment around the cells. (✓)
c. has the largest volume of all body fluid compartments. ( )
d. volume can be measured directly by dilution method using Evan's blue. ( )

59-The rate of diffusion of a particle across a membranc will increase if :

a)The area of the membrance increase.
b)The thickness of the membrane increase
c)The size of the particle increase
d)The concentration gradient of the particle decreases
e)The lipid solubility of the particle increases (a, e)

60-A typical cell membrane

a-Has a central lipid layer
b-Contains structural proteins and enzymatic proteins
c-Is completely impermeable to lipis-insoluble substances
d-Has protein channels which may be voltage or ligand gates (a)

Concerning transport across the cell membrane:

a. the rate of diffusion of a particle will increase if its size increases ( )
b. simple diffusion display saturation kinetics. ( )
c. active transport is necessary for the movement of molecules against electrochemical gradient. (✓)
d. counter transport is transporting 2 molecules in the same direction. ( )

The rate of diffusion of a particle across a membrane will increase if

a) the area of the membrane decreases
b) the thickness of the membrane increases
c) the size of the particle increases
d) the lipid solubility of the particle increases

D

All the following transport processes show saturation, **EXCEPT** :

a) Na^+–glucose co-transport
b) simple diffusion
c) facilitated diffusion
d) primary active transport

B

Deuterium oxide and inulin are injected into a normal 40-year-old man. The volume of distribution of deuterium oxide is found to be 42 L and that of inulin 14 L

a) the man's plasma volume is about 7 L
b) the man's intracellular fluid volume is about 14 L
c) the man's total body water cannot be determined from these data
d) the man's intracellular fluid volume is about 28 L

D

The cell membrane contains:

a) peripheral proteins to which hormones can bind to produce their effects
b) lipids which prevent the diffusion of respiratory gases between extracellular and intracellular fluid
c) integral proteins which are important for the transport of fat soluble molecules
d) an energy-dependent transport process by which K^+ ions are normally removed from the cell (A)

18) The rate of diffusion of an uncharged solute across the cell membrane is inversely proportional to :

a) the concentration gradient of the solute across the cell membrane . ☐
b) the thickness of the cell membrane . ☒
c) the membrane area . ☐
d) the number of receptor protein in the cell membrane . ☐

9) Connexin is an important component of the :

a) sodium channels . ☐
b) sarcoplasmic reticulum . ☐
c) gap junction . ☒
d) synaptic vesicles . ☐

All the following transport processes show saturation EXCEPT:

a- facilitated diffusion. ( )
b- simple diffusion. (✓)
c- primary active transport. ( )
d- Na+- glucose co transport across the cell membrane. ( )

Active transport differs from facilitated diffusion in that:

a)It needs a carrier protein
b)It requires energy
c)It occurs with concentration gradient
d)Does not need a carrier (b)

- Facilitated diffusion:

a)Needs energy
b)Needs a carrier
c)Transport substances from low to high conc gradient
d)Is responsible for movement of water into the cell (b)

1-The lipid bilayer of the cell membrane:

a)Is composed almost entirely of phospholipids
b)Allows free diffusion of oxygen and alcohol through the membrane
c)Is highly permeable to Na^+
d)Is permeable to K^+ (b)

2-Regarding the transport mechanisms across the cellular membrane:

a)Facilitated diffusion is an active process
b)Ions pass freely through protein channels
c)Na^+-K^+ pump is an example of secondary active transport
d)Counter transport is transporting 2 molecules in the same direction (b)

The osmolality of

a) intracellular fluid is about twice that of extracellular fluid
b) 1.8 per cent sodium chloride is about twice that of normal plasma
c) 5 per cent dextrose solution is equal that of plasma
d) plasma is due more to its protein that to its electrolyte content

C or B

Preganglionic sympathetic neurons:

a. originate in the lateral horn of sacral segments. ( )
b. secrete acetylcholine . (✓)
c. are distributed to abdominal organs with the vagus nerve. ( )
d. pass uninterrupted to the organ they supply. ( )

In Horner's syndrome there is:

a. dilatation of the pupil on the affected side. ( )
b. lesion of the vagus nerve. ( )
c. increased sweat secretion. ( )
d. drooping of the upper eye lid on the affected side. (✓)

45-Which of the following is correctly paired

a)sino atrial node—nicotinic cholinergic receptors
b)autonomic ganglia—muscarinic cholinergic receptors
c)pilomotor muscles—b 2 adrenergic receptors
d)vasculature of some skeletal muscle—muscarinic cholinergic receptors
e)sweat glands—alfa2 adrenergic receptors (d)

46-Autonomic transmission

a)by preganglionic sympathetic nerves depends on muscarinic cholinergic transmission
b)by preganglionic parasympathetic nerves depends on muscarinic cholinergic transmission
c)by postganglionic sympathetic nerves depends on muscarinic cholinergic transmission
d)by postganglionic parasympathetic nerves depends on muscarinic cholinergic transmission
e)within autonomic ganglia depends on alfa adrenergic transmission (d)

47-Adrenaline

a)is released by cells in the adrenal cortex
b)directly stimulate heart rate more potently than noradrenaline
c)promotes vasoconistriction more potently than noradrenaline
d)promotes contraction of the radial muscle in the iris more potently than noradrenaline
e)is a steroid hormone (b)

48-Preganglionic neurons arise from the lateral born cells of the first and second thoracic segments:

a)Carry parasympathetic supply to the head and neck
b)end in terminal ganglia in effector organs
c)Relay in cervical ganglia
d)Cause increase cardiac contractility (C)

49-Stimulation of the parasympathetic system may lead to:

a)Increased heart rate
b)Relaxation of muscles of bronchi and bronchioles
c)Ejaculation of semen
d)Micturition (d)

3- Which of the following will increases as a result of stimulating parasympathetic nerves to the bronchial smooth muscle ?

a)lung compliance
b)airway diameter
c)elastic work of breathing
d)resistive work of breathing
e)anatomic dead space (d)

4- Sympathetic stimulation of the heart result in which of the following ?

a)An increase in the activity of the SR calcium pump
b)decrease end systolic volume
c)An increase in the duration of diastole
d)A decrese in the affinity of troponin for calcium
e)A decreasing in the concentration of Ca2+ during systole (a, b)

Cardio

Nicotinic cholinergic receptors are:

a. present in the smooth muscles. ( )
b. blocked by atropine. ( )
c. members of voltage-gated ion channels. ( )
d. present at the motor end plate. (✓)

Muscarinic receptors:

a. can be blocked by atropine. (✓)
b. are present in the autonomic ganglia. ( )
c. can be stimulated by a small dose of nicotine. ( )
d. stimulation cause increased heart rate. ( )

Vagotomy results in:

a. decreased sweat secretion. ( )
b. decreased gastric acid and motility. (✓)
c. decreased heart rate. ( )
d. pupillary dilatation. ( )

5- Stimulation of the central (proximal) end of a cut vagus nerve would be expected to

a)increase heart rate
b)stimulate inspiration
c)inhibit coughing
d)raise blood pressure
e)cause apnea (e)

6-beta-adrenergic receptors stimulation produce all the following effects EXCEPT:

a) increase the contractility of cardiac muscle
b) increase the rate of discharge of the sinoatrial node
c) increase cardiac output
d) constrict coronary arteries by a direct action on these blood vessels
e) dilate blood vessels in skeletal muscle (d)

7-Acetylcholine:

a)is produced both at the sympathetic and parasympathetic ganglia.
b)will cause the pupil to dilate (mydriais).
c)blockage results in increased intestinal secretion and motility.
d)remains longer in the circulation. (a)

Regarding the autonomic nervous system:

a) The sympathetic system is catabolic (energy consuming)
b) Parasympathetic acts as one unit in stresses
c) Sympathetic system arises from some cranial nerves and few sacral segments
d) Sympathetic ganglia are terminal (a)

The parasympathetic division of the autonomic nervous system:

a) Arises from sacral segments number 1, 2, 3 only
b) Is anabolic in function
c) Is adrenergic
d) None of the above (d)

Stimulation of the cervical sympathetic division causes:

a) Vasodilatation of skin blood vessels
b) Trophic salivary secretion
c) Decrease sweat secretion
d) None of the above (b)

5

7) **The adrenal medulla :**

a) secretes mainly at rest and during sleep . ☐
b) is stimulated by acetylcholine . ☒
c) 80 % of its secretion is noradrenaline . ☐
d) stimulation increases sweat secretion . ☐

Sympathetic nervous system stimulation produces:

a- constriction of the pupils. ( )
b- an increase in motility of the intestine. ( )
c- dilatation of the cutaneous blood vessels. ( )
d- an increase in blood glucose level. (✓)

Regarding adrenergic receptors:

a- α_1 receptors produce their effects through increasing cAMP. ( )
b- $\alpha 2$ receptors present in the heart increase force of myocardial contractility. ( )
c- β receptors produce their effect by increasing cAMP. (✓)
d- stimulation increases sweat secretion. ( )

-Which of the followings does not affect the stroke volume?

a- preload. ( )
b- ventricular contractility. ( )
c- sympathetic nervous system. ( )
d- parasympathetic nervous system. (✓)

cardio

- Blockade of beta adrenergic receptors is likely to cause:

a- an increase in heart rate. ( )
b- worsening of the condition in patient with bronchial asthma. (✓)
c- sweat secretion. ( )
d- increase of myocardiac contractility. ( )

Which of the following is correct?

a)Noradrenaline (NE) is secreted by the preganglionic sympathetic fibers
b)ACh is inactivated by the enzyme acetylcholine transferase
c)ACh binds to muscarinic receptors only
(d)Autonomic ganglia are located outside the CNS
e)The receptors in the autonomic ganglia are muscarinic . (d)

Blockage of β-adrenergic receptor produces:

a. bronchiolar dilatation. ( )
b. a decrease in heart rate. (✓)
c. dilatation of the pupil. ( )
d. inhibition of ejaculation. ( )

Cholinergic nerve fibres include:

a. all post ganglionic sympathetic fibres. ( )
b. postganglionic sympathetic fibres to sweat glands. (✓)
c. sympathetic fibres to small intestine. ( )
d. postganglionic fibres that cause papillary dilatation. ( )

Parasympathetic stimulation results in:

a. decreased salivary secretion. ( )
b. increased intestinal secretion and motility. (✓)
c. increased blood glucose level. ( )
d. bronchiolar dilatation. ( )

6

) Increased sweating is mediated by increased:

a) secretion of acetylcholine by the postganglionic sympathetic fibres to the skin.
b) secretion of acetylcholine by the postganglionic parasympathetic fibers to the skin. .
c) secretion of norepinephrine by the postganglionic sympathetic fibers to the skin.
d) Secretion of epinephrine in the end portions of the sympathetic fibres to the skin (A)

) Cholinergic nerves include all, EXCEPT:

a) all preganglionic parasympathetic.
b) all postganglionic sympathetic.
c) parasympathetic postganglionic.
d) preganglionic fibres to adrenal medulla. (B)

Stimulation of the vagus nerve causes:

a) contraction of the spleen.
b) reduction in the strength of ventricular contraction.
c) bradycardia (slowing of the heart rate).
d) dilatation of the bronchioles. (C)

Catecholamines acting on alpha adrenergic receptors:

a) dilate the blood vessels in skeletal muscle.
b) cause pupillo-dilatation.
c) increase contractility of cardiac muscle.
d) relax the gastrointestinal sphincters. (B)

4) Generalized sympathetic stimulation is characterized by :

a) decreased conduction rate in the atrioventricular node . ☐
b) contraction of smooth muscle in the intestinal wall . ☐
c) dilatation of the eye pupil . ☒
d) reduction in the total peripheral resistance . ☐

5) Blockade of α-adrenergic receptors causes reduction in :

a) heart rate . ☐
b) motility of the gastrointestinal tract . ☐
c) total peripheral resistance . ☒
d) sweat secretion . ☐

2) Atropine which blocks muscarinic receptors causes :

a) failure of accommodation for near vision . ☒
b) constriction of the pupil . ☐
c) increase sweat secretion . ☐
d) increase gastric secretion . ☐

Regarding the sympathetic nervous system:

a- the preganglionic neurons originate from the lateral horn cells of all thoracic and all lumbar segments. ( )
b- the postganglionic neurons are embedded in the effector organ. ( )
c- it helps the individual to cope with stress situations. (✓)
d- it is anabolic and helps to conserve energy. ( )

The alarm response is accompanied by all of the following, EXCEPT:

a) high level of circulating adrenaline.
b) hypotension.
c) pupillo-dilatation (mydriasis).
d) rise of blood glucose level. (B)

Atropine (which blocks muscarinic receptors) causes
a) paralysis of accommodation for near vision in the eye
b) constriction of the pupil
c) constriction of the bronchi
d) stimulation of micturition

A

when activated by β-adrenergic receptors, the G proteins :
a) stimulate the release of Ca^{2+} from sarcoplasmic reticulum
b) activate phospholipase -C
c) activate protein kinase C
d) activate adenyl cyclase

D

. Increased sweating is mediated by increased :
a) secretion of acetylcholine by the postganglionic sympathetic fibers to the skin
b) secretion of epinephrine in the end portions of the sympathetic fibers to the skin
c) secretion of norepinephrine by the postganglionic sympathetic fibers to the skin
d) secretion of acetylcholine by the postganglionic parasympathetic fibers to the skin

A

The sympathetic response in a "fight or flight" reaction causes a decrease in
a) the diameter of the pupil
b) the arterial blood pressure
c) the resistance of the airways
d) the blood glucose concentration

C

Parasympathetic nerves
a) have opposite effects to sympathetic nerves on intestinal smooth muscle
b) cause vasodilatation in skeletal muscle during prolonged exercise
c) cause sweat secretion in skin when body temperature rises
d) have longer postganglionic than preganglionic fibers

A

Alpha adrenoreceptors :
a) are activated by noradrenaline only
b) are responsible for constriction of skin arterioles
c) mediate the dilatation of the bronchioles which accompanies sympathetic stimulation
d) are involved in acceleration of the heart induced by noradrenaline

B

-Administration of physostigmine, a drug that inhibits acetylcholinestrase would be excepted to produce all the following <u>EXCEPT</u>:
a) an increase of gastric secretion .
b) an increase of adrenaline secretion from adrenal medulla .
c) inhibition of micturation .
d) slowing of the heart. (C)

-Alpha adrenergic receptor stimulation produces all the following, <u>EXCEPT</u>:
a) contraction of the dilator pupillae muscle.
b) inhibition of gastro-intestinal sphincters.
c) contraction of the piloerector muscle.
d) inhibition of the gastrointestinal motility. (b)

(8)

2- B_2-adrenoreceptor
a)increase cardiac contractility when activated
b)release catecolamines in response to activation of nicotinic receptors
c)cause vasoconistriction when activated
d)cause bronchodilatation when activated
e)lead to accommodation for near vision when activated (d)

13-Sympathetic nerve activity
a) is essential for survival
b)causes contraction of some smooth muscles and relaxation of others
c)causes relaxation of the radial muscle of the eye to dilate pupil
d)relaxes smooth muscle of the gastrointestinal wall and sphenters
e)all of the above (b)

14-Parasympathetic nerve activity
a)is essential for survival
b)affects only smooth muscles and glands
c)causes contraction of the radial muscle of the eye to allow accommodation for near vision
d)contracts smooth muscle of the gastrointestinal wall and relaxes sphenters
e)all of the above (d)

- Inhibition of parasympathetic activity causes a reduction in :
a- resting heart rate
b- salivation
c- sweat secretion
d- acetyle choline secreted by the motor nerve (b)

- Regarding sympathetic nervous system
a- transmission at the heart is mediated by adrenaline
b- transmission at the sweat gland is mediated by noradrenaline
c- stimulation causes pupillodilatation
d- stimulation produces hypoglycemia (C)

- Drugs that block the beta –adrenergic receptors lead to
a- increase heart rate
b- increase force of ventricular contraction
c- decrease gastric acid secretion and motility
d- decrease arterial blood pressure (d)

- Concerning Horner's syndrome there is :
a- lesion of occulomotor nerve on one side
b- dilatation of the pupil on the affected side
c- drooping of the upper eye lid on the affected side
d- increased sweating on the affected side. (C)

· A patient who has a tumor of the adrenal medulla may present with:
a) transient rise of arterial blood pressure.
b) hypoglycemia.
c) increased sweat secretion.
d) marked decrease of the heart rate. ( )

Stimulation of the vagus nerve causes:
a) contraction of the spleen.
b) reduction in the strength of ventricular contraction.
c) bradycardia (slowing of the heart rate).
d) dilatation of the bronchioles. (C)

(9)

- **Regarding autonomic ganglia:**
  a)They are collection of nerve cells inside the CNS
  b)The collateral type is pure sympathetic
  c)The lateral ganglia allow relay of both sympathetic and parasympathetic fibers
  ⓓThe terminal type is pure parasympathetic (d)

- **The following organs have sympathetic supply, except:**
  a)Sweat glands
  b)Blood vessels of skeletal muscles
  ⓒCoustrictor pupillae muscles
  d)Ventricular muscle (C)

- **The greater splanchnic nerve:**
  ⓐBelongs to sympathetic system
  b)Increases contraction of wall of gastrointestinal tract and inhibits its sphincters
  c)Decreases glycogenolysis and fibrinogen formation from the liver
  d)Produces dilatation of bronchi (a)

Increased sweating is mediated by increased:
  a)Activity of the parasympathetic fibers to the skin
  b)Secretion of noraderenaline at the end the sympathetic fibers to the skin
  ⓒSecretion of ACh from the postganglionic sympathetic fibers of the skin
  d)Secretion of adrenaline at the end the sympathetic fibers to the skin (c)

Metabolites An increase in sympathetic activity leads to:
  a)A decrease in HR
  ⓑAn increase in HR
  c)A decrease in TPR
  d)A decrease in cardiac output
  e)Venodilation (b)

Stimulation of the vagus nerve produces:
  a)True salivary secretion
  ⓑBronchoconstriction
  c)Papillary constriction
  d)Contraction of urinary bladder wall
  e)Erection (b)

1

The action potential of the nerve:

a. has a depolarization phase due to increased K^+ influx. ( )
b. decreases in amplitude as it moves along the axon. ( )
c. is smaller in size if the extracellular fluid Na^+ concentration is reduced. (✓)
d. results in a transient reversal of concentration gradient of Na^+ across the cell membrane. ( )

Excitability of the nerve fiber is increased in the following condition:

a. a decrease in extracellular K^+ concentration. ( )
b. a decrease of Na^+ concentration in ECF. ( )
c. low Ca^{2+} concentration in ECF. (✓)
d. high Ca^{2+} concentration in ECF. ( )

A motor unit that innervates only 5 muscle fibers is likely to innervate muscles in the:

a. back. ( )
b. thigh. ( )
c. thumb. (✓)
d. intestine. ( )

Myosin light chain kinase:

a. is an important regulatory protein in skeletal muscle. ( )
b. attaches phosphate group to the myosin light chains for cross-bridge cycling. (✓)
c. decrease the affinity of myosin cross bridge for the active site on the actin filaments. ( )
d. terminates contraction of smooth muscle by removing phosphate from myosin light chains. ( )

Familial periodic paralysis is due to:

a. decreased ATP synthesis in skeletal muscle. ( )
b. decreased release of acetylcholine at the motor end plate. ( )
c. low extracellular fluid K^+ concentration. (✓)
d. decreased calcium concentration in extracellular fluid. ( )

Chronaxie is:

a. the time needed for the rheobase to stimulate a nerve fiber. ( )
b. the utilization time. ( )
c. minimum intensity of the stimulus needed to excite a nerve fiber. ( )
d. a measure of excitability. (✓)

The resting membrane potential is:

a. closer to Na^+ equilibrium potential than to the K^+ equilibrium potential. ( )
b. is maintained by the Na^+- K^+ pump. (✓)
c. affected by or change of Na^+ concentration in ECF. ( )
d. will be depolarized if the extracellular Ca^{2+} concentration increases. ( )

Local response:

a. obeys all or none rule. ( )
b. can be propagated till the end of the nerve fiber. ( )
c. is accompanied with increased excitability. (✓)
d. is a state of passive depolarization at the cathode. ( )

26- Concerning the nerve fiber membrane at rest, the following is correct:

a)The sodium pump moves sodium in-and potassium out of the fiber
b)The extracellular K^+ concentration is more than its intracellular concentration
c)The concentration gradient for K^+ is such that it tends to move into the fiber
(d)If the resting potential is moved to a less negative value, the fiber becomes more excitable (d)

27- During action potential of nerve fiber:

(a)Voltage-gated Na^+ channels open during ascending limb of depolarization and reversal of polarity
b)Reversal of polarity reaches +50 mV
c)Repolarization (descending limb) is due to K influx
d)Firing level occurs at membrane potential +60 mV (a)

28- Excitation-contraction coupling in skeletal muscle doesn't include:

a)Occurrence of muscle action potential
b)Propagation of muscle action potential
c)Release of calcium by sacoplasmic reticulum
(d)Binding of calcium with calmodulin
e)Myosin head binding and cycling (d)

29- Which of the following is correct?

a)Troponin I-binds to tropomysin
b)During the absolute refractory period the membrane responds to a suprathreshold stimulus
c)Muscle relaxation does not require ATP
d)All smooth muscles have a stable RMP
(e)During the relative refractory period the membrane responds to a suprathreshold stimulus (e)

30- Neuromuscular transmission is:

a) Inhibited by Ca^{++}
(b) Stimulated by prostigmine
c) Stimulated by magnesium
d) Ended by reuptake of ACh by synaptic knobs
e) Inhibited by methacholine (b)

Regarding myasthenia gravis, all the following statements are true, EXCEPT:

a. it may be due to decrease in amount of acetylcholine released by the motor nerve endings. (✓)
b. is an autoimmune disease. ( )
c. is due to decreased number of acetylcholine receptors on the motor end plate. ( )
d. can be treated by choline estrase inhibitors. ( )

Visceral smooth muscle:

a. have stable membrane potential. ( )
b. contraction depends on Ca^{2+} released from the sarcoplasmic reticulum. ( )
c. may show action potential with plateau. (✓)
d. contain troponin-tropomyosin complex to prevent cross-bridge cycling. ( )

- **End plate potential of skeletal muscle is:**
  a. a local depolarization of motor end plate by increased permeability to Na^+ and K^+. (✓)
  b. local decrease in the membrane potential associated with increased permeability to Ca^{2+} ( )
  c. a reversal of polarity of the end plate that propagates along the whole muscle fiber. ( )
  d. is the result of spontaneous quantal release of acetylcholine from motor nerve ending. ( )

- **Contraction of skeletal muscle:**
  a. starts after the action potential is over. ( )
  b. is associated with widening of H-Zone. ( )
  c. produces more work when the muscle contracts isotonically than when it contracts isometrically. (✓)
  d. is terminated by removal of Ca^{2+} from the motor nerve endings. ( )

- **Regarding neuromuscular junction:**
  a. there is a high concentration of choline estrase enzyme. (✓)
  b. miniature end-plate potential can be recorded in the motor nerve terminal ( )
  c. transmission can be blocked by curare because it competes with Na^+ influx during muscle action potential. ( )
  d. there are gap junctions between motor nerve endings and skeletal muscle fibers. ( )

During cross-bridge cycling:
  a. Z-membranes become widely apart. ( )
  b. Ca^{2+} binds with actin filaments to expose active sites for combination with myosin heads. ( )
  c. ATP is needed for release of myosin heads from actin molecules. (✓)
  d. both myosin and actin filaments shorten to reduce the sarcomere length. ( )

58- which of the following statements is true regarding the resting membrane potential of a cell?

a)The resting membrane potential value is closer to the K~ equilibrium potential than to the Na^+ equilibrium potential, because the cell membrane is preferentially permeable to K^- ion
b)The resting membrane potential shows a negative value indicating an excess of negative charges at the inside of the cell membrane
c)The Nernst equation can be used to calculate the equilibrium potential for a single ion species.
d)The Goldman constant-field equation predicts the resting membrane potential value as a function of ion concentrations and membrane permeabilities
e)All of the above statements are true (e)

Starling's law states there is:

a) An inverse relation between tension and initial length
b) A direct relation between tension and load
c) A direct relation between load and velocity of shortening
d) An inverse relation between load and velocity of shortening
e) A direct relation between tension and initial length within limits (e)

During depolarization phase of the action potential:

a) The membrane becomes more permeable to K^+ than Na^+ ions
b) The nerve cannot respond to another stimulus whatever its intensity
c) Excitability of the nerve is increased
d) There is an increased influx of Cl^- ions (b)

52-Tetanic contraction of a skeletal muscle fiber results from a cumulative increase in the intracellular concentration of which of the following?

a)Na^+
b)K^+
c)Troponin
d)ATP
e)Ca^+ (e)

53-All the following statements are correct, <u>except</u>:

a)The selective permeability of the membrane is responsible for resting state
b)Na^+-K^+ pump requires energy which is taken from ATP
c)The Na^+-K^+ pump keeps the normal distribution of ions
d)Na^+-K^+ pump is responsible for the pumping of Na^+ to inside the nerve fibers (d)

54-The rate of conduction of action potential along the nerve will be increased by:

a)Decreasing the diameter of the nerve.
b)Lengthening of the nerve fibre.
c)Myelinating the nerve.
d)Stimulating the Na^+- k^+ pump (C)

55- Which one of the following conditions will a decrease in the magnitude of a nerve membrane action potential?

a)Decreasing the conductance of membrane to potassium
b)Stimulating the nerve during the relative refractory period
c)Increasing the extracellular concentration of sodium
d)Making the membrane potential more negative
e)Increasing the magnitude of the stimulus (b)

56- In a normal, healthy muscle, what occurs as a result of propagation of an action potential to the terminal membrane of a motor neuron?

a)Opening of voltage-gated Ca^{++} channels in the presynsptic membrane.
b)Depolarization of the T tubule membrane follows.
c)Always results in muscle contraction.
d)Increase in intracellular Ca^{++} concentration in me motor neuron terminal.
e)All of the above are correct (a)

57-The functions of tropomyosin in skeletal muscle include

a)sliding on actin to produce shortening
b) releasing Ca^{2+} after initiation of contraction
c) binding to myosin during contraction
d)acting as a "relaxing protein" at rest by covering up the sites where myosin binds to actin
e)generating ATP, which it passes to the contractile mechanism (d)

0-Which of the following decreases in length during the contraction of a skeletal muscle fiber?

a)Thin filaments
b)Thick filaments
c)Z discs of the sarcomere.
d)A band of the sarcomere.
e)I band of the sarcomere. (e)

51-The delayed onset and prolonged duration of smooth muscle contraction, as well as the greater force generated by smooth muscle compared with skeletal muscle, are all consequences of which of the following?

a)Higher energy requirement of smooth muscle.
b)Slower cycling rate of the smooth muscle myosin cross-bridges.
c)Slower uptake of Ca^{++} ions following contraction.
d)Physical arrangement of actin and myosin. Filaments.
e)Greater amount of myosin filaments present in, smooth muscle (b)

Myosin light chain kinase:

a) is essential for initiation of cardiac muscle contraction in response to Ca^{++} influx from ECF.
b) is important regulatory protein in skeletal muscle.
c) attaches phosphate group to the myosin light chains necessary for cross-bridge cycling in smooth muscle.
d) terminates contraction of smooth muscle by removing phosphate (C)

Regarding the visceral smooth muscle:

a) contain troponin-tropomyosin complex to prevent cross-bridge cycling.
b) have stable membrane potential.
c) may show action potential with plateau.
d) contraction occur more rapidly in comparison to skeletal muscle (C)

A study of the neuromuscular junction reveals that:

a) an impulse arriving at the motor nerve ending increases the permeability of that ending to Na^{+}.
b) the end plate potential can propagate on both sides of the motor end plate.
c) the end plate potential results in an action potential being produced in the muscle cell.
d) curare blocks neuromuscular transmission (C,D) C / D

Regarding the local response in a nerve fibre, the following is true, EXCEPT:

a) it can result from application of subthreshold stimulus.
b) it is proportional to the strength of the stimulus.
c) it can propagate along the nerve fiber for long distance.
d) it is accompanied by increased excitability. (C)

1) Skeletal muscle contraction is terminated by :

a) removal of acetyl choline from the neuromuscular junction . ☐
b) removal of Ca^{++} from the motor nerve endings . ☐
c) closure of the cholinergic receptors at the motor end plate . ☐
d) removal of calcium from the sarcoplasm . ☒

2) Excitation – contraction coupling in skeletal muscle involves all of the following events except :

a) increase in permeablility of the muscle fiber to Na^{+} . ☐
b) binding of Ca^{++} to calmodulin . ☒
c) ATP hydrolysis . ☐
d) cross-bridge cycling . ☐

3) In what way does visceral smooth muscle differ from skeletal muscle ?

a) visceral smooth muscle does not contain actin . ☐
b) contraction of smooth muscle is ATP dependent . ☐
c) visceral smooth muscle can contract in response to stretch . ☒
d) contraction of visceral smooth muscle is calcium dependent . ☐

4) Which of the following decreases in length during skeletal muscle contraction ?

a) myosin filaments . ☐
b) actin filaments . ☐
c) A-band of the sarcomere . ☐
d) I-band of the sarcomere . ☒

-The following are true statements about Na+ -K+ pump EXCEPT:

a- it maintain a high extra cellular Na+ concentration and a low intra cellular K+ concentration. (✓)

b- it transports 3 Na+ to the outside and 2 K+ ions to the inside. ( )

c- its B-subunit has AT Pase activity. ( )

d- it is an example of primary active transport. ( )

6

Excitation – contraction coupling in smooth muscle:

a- is mediated primarily by calcium ions released from the sarcoplasmic reticulum. ( )

b- is mediated by calcium influx from ECF and that released from the sarcoplasmic reticulum. (✓)

c- involves binding of calcium to troponin with subsequent binding of myosin cross bridges to active sites on actin filaments. ( )

d- thin actin filaments polymerize to from actin monomer. ( )

Motor end plate potential:

a- is a state of depolarization due to calcium entery. ( )

b- is a localized non propagated response. (✓)

c- obeys all or none law . ( )

d- increases with increased Ca++ concentration in the extra cellular fluid. ( )

The term chronaxie refers to:

a- the time it takes for the rheobase to stimulate a nerve fiber. ( )

b- the minimum duration of any stimulus to excite a nerve. ( )

c- the utilization time . ( )

d- the time it takes for a current of twice the rheobase to stimulate a nerve. (✓)

The transverse tubules of the skeletal muscle:

a- contain intracellular fluid rich in K+. ( )

b- pumps Ca++ from ECF into the sarcoplasm during spread of action potential. ( )

c- conduct action potential to the interior of the muscle fiber. (✓)

d- stores Ca++ for release during the excitation-contraction coupling. ( )

21-Concerning the voltage gated sodium channels:

a)The activation gate for sodium are closed at rest

b)The inactivation gate for sodium are closed at rest

c)At the firing level, the conformational changes in the membrane open the inactivation channels

d)Non of the above (a)

22-During excitation-contraction coupling in smooth muscle:

a)Ca^{++} comes from cisternae of longitudinal tubules

b)Ca^{++} binds to troponin C

c)Ca^{++} comes from T-tubules

d)Ca^{++} binds to calmodulin

e)Cycling of myosin over actin is very rapid (d)

23- Which of the following will be less during the overshoot of an action potential than during the resting state.

a)Potassium

b)Sodium and potassium

c)Chloride

d)Potassium and chloride

e)Sodium (e)

5) **ATP is used directly by skeletal muscle for the following processes EXCEPT :**

a) transport of Na^+ from the intracellular to the extracellular fluid . ☐
b) transport of K^+ from the extracellular to the intracellular fluid . ☐
c) pump of Ca^{++} from sarcoplasm into the sarcoplasmic reticulum . ☐
d) transport of glucose into muscle fibers . ☒

6) **An action potential in a nerve fiber :**

a) has a amplitude which varies directly with intensity of the stimulus . ☐
b) occur when its membrane is depolarized by 5 mV . ☐
c) is associated with an increase in membrane permeability to Na^+ and K^+ . ☒
d) declines in amplitude as it moves along the nerve fiber . ☐

7) **Functions of myosin ATPase include :**

a) pumping of Ca^{++} back into the sarcoplasmic reticulum . ☐
b) cross-bridge cycling in skeletal muscle . ☒
c) decreasing the affinity of the myosin-cross bridge for the active site on the thin filament . ☐
d) maintaining the latch state in skeletal muscle . ☐

8) **The functions of tropomyosin in skeletal muscle include :**

a) sliding of actin to produce shortening . ☐
b) releasing of Ca^{++} after initiation of contraction . ☐
c) acting as a relaxing protein at rest by covering up the active site on actin . ☒
d) generating ATP which it passes to the contractile . ☐

9) **Na^+-K^+ pump :**

a) couples Na^+ and K^+ pump in a ratio of 1:1 . ☐
b) prevents intracellular accumulation of Na^+ . ☒
c) requires energy which is provides by GTP . ☐
d) is the main cause of the resting membrane potential . ☐

10) **Oxygen debt :**

a) is the oxygen consumed during muscular exercise . ☐
b) represents the basal oxygen consumption . ☐
c) is used to replenish ATP and remove excess lactic acid . ☒
d) is more in atheletes than in non atheletic subjects . ☐

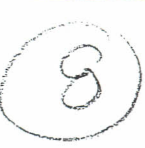
11) **Exercise training increases all the followings EXCEPT :**

a) number of muscle fibers . ☒
b) thickness of the muscle fibers . ☐
c) total number of myofibrils . ☐
d) the muscle content of contractile proteins . ☐

- **Membrane stabilizers include all, EXCEPT:**

a- decreased extracellular K^+ concentration
b- increased extracellular Ca^{++} concentration
c- veratridine drug
d- local anesthetic

(C)



The action potential of skeletal muscle :

a) is longer than the action potential of cardiac muscle .
b) has a prolonged plateau phase .
c) spreads inward to all parts of the muscle via the T tubules .
d) causes immediate uptake of Ca ++ into the sarcoplasmic reticulum (C)

Regarding skeletal muscle, the following is true, EXCEPT:

a) contraction occurs when Ca^{++} is released from the sarcoplasmic reticulum..
b) twitch tension has a time course similar to the time course of the action potential.
c) twitch tension is maximum at an initial length equal to the resting length.
d) the amount of tension generated can be altered by altering the frequency of stimulation (B)

Regarding myelinated nerve fibres :

a) velocity of nerve impulse along the axons is less than in non-myelinated fibres..
b) generation of action potentials occurs only at the nodes of Ranvier.
c) more energy is required to maintain ion gradients across the membrane than in non-myelinated fibres .
d) are more sensitive to local anesthetic than non-myelinated fibres (B)

Hypokalemia reduces excitability of the nerve and muscle cells because decreased extracellular K+:

a) increases activity of Na^+-K^+ ATPase which hyperpolarizes the cell.
b) hyperpolarizes the cell, which increases the action potential threshold.
c) decreases the number of Na^+ channels.
d) depolarizes the cell, thus inactivating voltage-gated Na^+ channels(B)

During cross-bridge cycling:

a) Ca^{++} binds with actin filament to expose active sites for combination with myosin.
b) myosin filaments shorten to reduce sarcomere length.
c) the actin filaments shorten to reduced the length of the sarcomere.
d) ATP is needed for release of myosin cross-bridge from actin molecules (D)

Regarding Myathenia Grave's all the following is true, EXCEPT:

a) is an auto-immune disease.
b) is due to decreased number of acetylcholine receptors on the motor end plate.
c) can be treated with prostigmine
d) may be due to decrease in amount of acetylcholine released (D)

5- **Nerve action potential**

a- is initiated by Na^+ efflux
b- is not accompanied by ARP
c- declines in amplitude as it moves along the axon
d- can be produced by repeated successive subthreshold stimuli (d)

(9)

The Strength-Duration curve:

a) is the relationship between the duration of the stimulus and amplitude of response
b) strong stimuli of extreme short duration can excite the nerve
c) has a rheobase which is 2 times chronaxie
d) has a chronaxie which is the time needed by double the rheobasic strength to stimulate the nerve

D

End-plate potential of skeletal muscle is:

a) local depolarization of motor end plate caused by an increased permeability to Na^+ and K^+
b) local decrease in membrane potential associated with increased permeability to Ca^{++} ions
c) a reversal of polarity at the end plate that propagates along the whole muscle fiber
d) is a state of hyperpolarization

A

An axon is connected to stimulating and recording electrodes. The distance from stimulating electrode to the intracellular recording electrode is 4.5 cm. when the axon is stimulated; the latent period is 0.5 ms.
The conduction velocity of the axon is:

a) 15 m/s
b) 90 m/s
c) 30 m/s
d) 60 m/s

B

Smooth muscle contractions:

a) depends mainly on Ca^{2+} influx from extracellular fluid
b) depends mainly on Ca^{2+} released from the sarcoplasmic reticulum
c) is dependent on extrinsic nerve supply
d) occur more rapidly in comparison to skeletal muscle

A

In excitation contraction coupling

a) attachement of ATP to myosin heads is essential for detachment of myosin from actin
b) myosin–ATPase activation is dependent on an increase of intracellular Mg^{2+}
c) Ca^{2+} is actively pumped out of muscle fiber into T-tubules to initiate relaxation
d) Ca^{2+} released from sarcoplasic reticulum binds to tropomyosin to expose active sites on actin myofilaments

A

Excitability of the nerve fiber is increased by all of the following conditions, **EXCEPT**:

a) with decreased extracellular Ca^{2+} concentration
b) during catelectrotonus
c) with decreased extracellular K^+ concentration
d) during local excitatory state

C

An action potential generated in muscle fiber membrane causes release of Ca^{2+} ions from the sarcoplasmic reticulum by the following mechanism:

a) Depolarization of the T-tubule
b) Opening of ryanodine-calcium channels
c) Activation of dihydropyridine receptors in the T-tubule
d) All of the above

(d)

(10)

3- **All are true about isometric tension of the muscle , EXCEPT :**

a- Is related to the number of cross bridges

b- Is maximum at sarcomere length of 2.2 microns

c- Is measured by electronic transducer

d- Within limits, tension is inversely proportional to the initial length of the sarcomere

(d)

- **Acetylcholine relaeased at the neuromuscular junction :**

a- is stored in the muscle fiber motor end plate

b- opens channels in the motor end plate that are permeable to Na^+ and K^+

c- generates an action potential at the motor end plate

d- is inactivated by active reuptake by muscle fiber membrane(b)

Regarding the visceral smooth muscles

a- contain troponin-trpomyocyin complex to prevent cross-bridge cycling

b- have stable membrane potential

c- may show action potential with plateau

d- contraction occurs more rapidly in comparison to skeletal muscle

(C)

Regarding the action potential , all of the following is true , EXCEPT :

a- decreased ECF Na^+ reduces the size of the action potential

b- the absolute refractory period is the period from the firing level until early repolarization

c- it has varying amplitude when produced by stimuli of varying intensities

d- it is caused by a transient increase in Na^+ permeability followed by a prolonged increase in K^+ permeability

(C)

24-Which of the following statements is true regarding the propagation of an action potential along a nerve axon?

a) Saltatory conduction is associated with a slowing of action potential propagation.

b)The original action potential propagates for the length of the axon.

c)Multiple sclerosis (damage) is associated with increased conduction velocity.

d)Large myelinated nerve fibers conduct slower than small unmyelinated nerve fibers.

e)The propagation of action potentials requires a direct source of ATP.

(e)

25-Which of the following statements is true concerning ATP in skeletal muscle contraction?

a)Less ATP is consumed for each cross-bridge cycle during the contraction of afast twitch skeletal muscle than during cardiac muscle contraction.

b)ATP is necessary for Ca^{2+} release from the sarcoplasmic reticulum during excitation-contraction coupling.

c)ATP is necessary for detachment of cross-bridges during muscle contraction.

d) Increased cycling of cross-bridges reduces ATP consumption.

e) none of the above is true. (C)

26-Excitation-contraction coupling in skeletal muscle:

a-is mediated primarily by the influx of Ca^{++}ions from the extracellular fluid

b-occurs without a change in transmembrane potential

c-is mediated via the sodium calcium exchange mechanism

d-is mediated via an abrupt decrease in the activity of the Ca^{2+} ATPase, which pumps Ca^{2+}.ons into the sarcoplasmic reticulum

e-none of the above is correct (e)

27-The action potential of skeletal muscle

a)Has a prolonged plateau phase

b)Spreads inward to all parts of the muscle via the T tubules

c)Causes the immediate uptake of Ca^{2+}into the lateral sacs of the sarcoplasmic reticulum

d)Is longer than the action potential of cardiac muscle

e)Is not essential for contraction (b)

28-The contractile response in skeletal muscle

a)Starts after the action potential is over

b)Does not last as long as the action potential

c)Produces less tension when the muscle contracts isometrically than when the muscle contracts isotonically

d)Produces more work when the muscle contracts isometrically than when the muscle contracts isotonically

e)Decreases in magnitude with repeated stimulation ([illegible])

During excitation-contraction coupling in skeletal mscle:

a- binding sites on actin combine with cross bridges from myosin

b- Ca^{++} blocks the action of troponin and tropomyocin

c- Ca^{++} pumps to sarcoplasmic reticulum elicits contraction

d- Mg^{++} are released from sarcoplasmic reticulum (a)

1

A hematocrite value of 45 % means that in the sample of blood analyzed:

a- 45% of hemoglobin is in RBCs. ( )
b- 45% of the blood elements in the blood are RBCs. ( )
c- 45% of the total blood volume is made up of RBCs. (✓)
d- 45% of the total blood volume is made up of plasma. ( )

Lymphocytes:

a- all originate from the bone marrow after birth. ( )
b- are part of the body's defense against cancer. (✓)
c- convert to macrophages in response to antigens. ( )
d- constitute 10% of the total leucocytic count. ( )

The affinity of hemoglobin for oxygen is decreased by all the followings EXCEPT:

a- decreased pH of the blood. ( )
b- an increase in concentration of 2,3-D PG inside RBCs. ( )
c- rise of temperature. ( )
d- exposure to carbon monoxide. (✓)

Erythropoietin production is increased in the following conditions EXCEPT:

a- lung diseases as emphysema. ( )
b- hemolytic anemia. ( )
c- renal failure. (✓)
d- alkalosis. ( )

The following statements about Pernicious anemia are true EXCEPT:

a- it is due to atrophy of the gastric mucosa. ( )
b- it can be treated effectively by oral administration of vitamin B12(✓)
c- it may result from disease affecting terminal ileum. ( )
d-is characterized by RBCs having MCV more than 95 cubic micron.( )

The following statements about IgG are true EXCEPT:

a- it can cross the placenta. ( )
b-it is produced in large amount during the primary immune response(✓)
c-it stimulates phagocytosis by macrophages and polymorphs. ( )
d-it can activate the complement system. ( )

The following vitamins are needed for RBCs production EXCEPT:

a- Vitamin C. ( )
b- Folic acid. ( )
c- Vitamin K. (✓)
d- Vitamin B12. ( )

Regarding interferons, the following statements are true EXCEPT:

a- produced by B-lymphocytes. (✓)
b- activate the complement system. ( )
c- stimulate proliferation of T-lymphocytes. ( )
d- α and β. types have antiviral activity. ( )

Concerning CD 4 cells, the following are true statements EXCEPT:

a- are responsible for lysis of virus infected cells. (✓)
b- are the most numerous type of T-cells. ( )
c- it serves as a major regulator of all immune responses. ( )
d- are needed for full activation of B-lymphocytes. ( )

Regarding hemoglobin:

a) its normal amount in 100 ml blood is 20 mg/dL
b) fetal hemoglobin is composed of 2 α-chains and 2 β- chains
c) each molecule contains 4 Fe^{+++} atoms
d) in sickle cell anemia: Hb precipitates inside RBCs at low O_2 tension (D)

The hematocrite value rises in:

a. arterial than venous blood. ( )
b. megaloblastic anemia due to B12 deficiency. ( )
c. children presenting with severe diarrhea and dehydration. (✓)
d. infections, tissue destruction and malignancy. ( )

Eosinophils:

a. constitute 15% of the total leucocytic count. ( )
b. produce plasminogen into blood clot which help to digest blood clot when activated. (✓)
c. are produced by lymphatic tissue. ( )
d. constitute the first defensive line against invading viruses. ( )

Immunoglobulin G:

a. is produced in large amounts during the primary immune response. ( )
b. include ABO group antibodies. ( )
c. is a pentamere that has 10 antigen binding sites. ( )
d. it can cross the placenta to reach the fetal blood. (✓)

Natural cells (NK):

a. belong to T-lymphocytes. ( )
b. are the first line of defense against viral infections. (✓)
c. need previous antigen exposure for their activation. ( )
d. are activated by γ interferons. ( )

Antigen presenting cells include the following types of cells, EXCEPT:

a. dendrite cells in the lymph nodes. ( )
b. T-lymphocytes. (✓)
c. Langerhan's cell in the skin. ( )
d. B-lymphocytes. ( )

Interferons:

a. are system of proteins that activate the complement system. ( )
b. are produced by virus infected cells. (✓)
c. help opsonization of bacteria. ( )
d. are potent activators of B-lymphocytes. ( )

Erythropoisis is stimulated by all the following, except:

a) High altitude
b) Excessive hemolysis
c) Blood transfusion
d) Low arterial PO_2 (C)

The MCV is higher in blood of:

a)Left ventricle
b)Left atrium
c)Right atrium
d)Aorta (C)

Vitamin B_{12}: all are correct, except:

a)Is important for formation of nucleic acids
b)Deficiency causes pernicious anemia
c)Is readily absorbed from the duodenum in presence of HCl
d)Is essential for maturation of RBCs (C)

3

Immunoglobulin M :
a) is produced in large amounts in the primary immune response .
b) has the highest concentration in the plasma .
c) includes Rh antibodies .
d) can cross the placenta . (A)

Natural killer cells (NK) :
a) are the first line of defense against viral infection .
b) belong to T-lymphocytes .
c) show specificity to the invading virus .
d) optimal activity depends on previous exposure to the invading antigen(A)

Regarding plasma proteins, are all true, EXCEPT:
a) Provide an osmotic pressure of about 25 mmHg which is necessary for absorption of fluids from the interstitial spaces.
b) are formed mainly by the spleen.
c) deficiency causes oedema.
d) prevent the loss of iron and vitamin B_{12} in urine. (B)

Concerning CD4 cells, the following are true statements, EXCEPT:
a) are responsible for lysis of virus infected cell.
b) are the most numerous type of T-cells.
c) it serves as a major regulator of all immune responses.
d) are needed for full activation of β-lymphocytes. (A)

Concerning major histocompatability complex (MHC) the following is true, EXCEPT:
a) it is a glycoprotein present an the memebrances of WBCs.
b) only identical twins share same HLA (MHC).
c) is encoded by gene on chromosome 7.
d) MHC-II is present on the surface of APC and presents the antigen on the cell surface. (C)

7) Lymphocytes :
a) constitute 10 % of circulating white cells . ☐
b) decrease in number following removal of the thymus gland in adult . ☐
c) increase in number during prolonged cortisol administration . ☐
d) can transform into plasma cells . ☒

8) Thromboxane A_2 :
a) in a prostaglamdin formed by endothelial cells . ☐
b) cause vasodilatation . ☐
c) increase platelet aggregation . ☒
d) formation is increased by asprin . ☐

9) Immunoglobulins M :
a) are responsible for secondary immune response against bacteria . ☐
b) are secretory immunoglobulins . ☐
c) include anti-A and anti-B antibodies . ☒
d) can cross the placenta . ☐

(4)

11-Lymphocytes:

a)Form 1-2% of the white cell count
d)Are motile through pseudopodia
c)Can be transformed by a suitable stimulus into plasma cells that produce antibodies
d)Are responsible for both cellular and humoral immunity
e)c and d are correct (e)

12-which one of the following statements about the process of vitamin B12 absorption is correct ?

a)in humns, intrinsic factor is secreted fom chief cells of the gstric glands.
b)vitminB12 binds to intrinsic factor in the stomch
c)in adults,vitamin B12 absorption occurs along the length of the small intestine
d)absoption may be reduced in a patient with pancreatic insufficiency
e)absorption occurs via passive diffusion into the enterocyte (d,) b

13-What occurs following presentation of antigen by an infected cell?

a)Generation of antibodies
b)Activation of cytotoxic T cells
c)Increase in phagocytosis
d)Release of histamine by mast cells (b)

14-Which cells secrete circulating antibodies?

a)T helper lymphocytes
b)T suppressor lymphocytes
c)Dormant B lymphocytes
d)T killer lymphocytes (C)

15-Which of the following would result in a transfusion reaction? Assume that the patient has never had a transfusion.

a)Type O, Rh-negative packed cells to an AB, Rh-positive patient
b)Type A, Rh-positive packed cells to an A, Rh-negative patient
c)Type AB, Rh-positive packed cells to an AB, Rh-positive patient
d)Type A, Rh-positive packed cells to an O, Rh-positive patient (d)

The affinity of hemoglobin for oxygen is increased by :

a) increased [H^+] .
b) increased concentration of 2 , 3-DPG in RBCs .
c) carbon monoxide poisoning .
d) rise of blood temperature. (C)

The following conditions might cause normochromic normocytic anemia, EXCEPT :

a) glucose-6- phosphate dehydrogenese deficiency .
b) chronic bleeding peptic ulcer .
c) atomic radiations .
d) incompatible blood transfusion . (B)

) Iron deficiency :

a) is more common in men than in women . ☐
b) frequently follows chronic blood loss from the body . ☒
c) may cause large RBCs to appear in the blood . ☐
d) anemia should be treated by injection of iron . ☐

16)Extrinsic pathway of clotting:

a) Is slow
b) Needs tissue thromboplastin
c) Can occur in a test tube
d) Doesn't need Ca^{++} in the first two steps
e) Starts by activation of factor XII ( )

17)Regarding plasma proteins:

a) Albumin is mainly synthesized by the reticulo-endothelial system
b) Fibrinogen is the primary determinant factor for capillary permeability
c) Normally, albumin is about doubled the amount of globulin
d) Viscosity is mainly done by the level of fibrinogen ( )

18)Erythropoietin is released from:

a) The kidneys and the liver
b) The spleen
c) Damaged tissue
d) The bone marrow ( )

19)About iron metabolism which is correct:

a) 60% of iron is present in enzymes
b) Iron is absorbed mainly in the Fe^{++} state
c) Iron is stored mainly in the bone marrow
d) Iron is stored in the form of transferrin
e) Iron is absorbed in small intestine by simple diffusion ( )

- Regarding T-cytotoxic cells (Tc) the following statements are true, EXCEPT:

a. are the most numerous type of T-lymphocytes. ( )
b. cause lysis of malignant cells by secreting perforins. ( )
c. are responsible for rejection of transplants of foreign tissues. ( )
d. recognize antigen accompanied with MHC-1. ( )

- Regarding erythroblastosis foetalis of the new borne, the following are true EXCEPT:

a. the affected baby is severly anemic and jaundiced. ( )
b.it may result in brain damage due to rise of bilirubin level in the blood( )
c. is more likely to occur when an Rh positive male marries an Rh negative female. ( )
d. never occur in the first pregnancy. ( )

8-Liver is important in erythropoisis as it produce the following, except:

a)It is site for storage of iron, vitamin B_{12}
b)It shares in formation of erythropoietin hormone
c)It is responsible for complete formation of haemoglobin
d)It is responsible for synthesis of RBCs in the fetal life ( )

(6)

34-Erythropoietin is secreted by:
a)Cells in the macula densa
b)Cells in the proximal tubules
c)Cells in the renal glomeruli
d)Juxtaglomerular cells
e)Cells in the cortical peritubular capillaries (e)

35-hemolytic disease of the newborn (Erythroblastosis fetails):
a)Is due to the presence of anti-D antibodies in maternal circulation
b)Is characterized by jaundice which improves spontaneously immediately after birth
c)Has been made rarer by treating appropriate mothers with anti-D antibody before delivery
d)Is treated by exchange transfusion with blood of the same ABO and Rhesus group as the mother (a)

36-A 45-year-old man presents to the emergency room with a 2-week history of diarrhea that has gotten progressively worse over the last several days. He has minimal urine output and is admitted to the hospital for dehydration. His stool specimen is positive for parasitic eggs. Which type of white blood cells would be elevated in number?
a)Eosinophils
b)Neutrophils
c)T lymphocytes
d)B lymphocytes
e)Monocytes (a)

37-A 40-year-old woman visits a clinic complaining of fatigue. She has recently been treated for an infection. Her laboratory values are as follows:
Red blood cell count = 1.8 x Itf/mm1
Hemoglobin = 5.2g/dl
Hematocrit =.15 per cent
White blood cell count s= 7.6 x 10^3mm^3
Platelet count = 320,000/mm3
Mean corpuscular volume = 92 fL
What is the most likely explanation for this presentation?
a)Aplastic anemia
b)Hemolytic anemia
c)Hereditary spherocytosis
d)Vitamin B_{12} deficiency (b)

8-Which of the following a true statement
a)In a transfusion reaction, there is agglutination of the recipient rbcs
b)Shutdown of the kidneys following a transfusion reaction occurs slowly
c)Transfusion of Rh-positive blood into any Rh-negative recipient will result in an immediate transfusion reaction
d)A person with type AB blood is considered to be a universal recipient (d)

;9-Healthy mother with type A-positive blood has just delivered her second child. The father's blood type is o-negative. Knowing that the child has type O, Rh-negative blood, what would you expect to find?
a)The child will have erythroblastosis fetalis due to Rh incompatibility
b)The child will have erythroblastosis fetalis due to ABO blood group incompatibility
c)The child will have both (A) and (B)
d)The child has no chance of developing erythroblastosis fetalisd. (d)

7

Erythropoietin hormone secretion is increased in the following conditions EXCEPT:

a. normochromic normocytic anemia. ( )
b. renal failure. (✓)
c. alkalosis that develops at high altitudes. ( )
d. β-adrenergic stimulation. ( )

Plasma albumin:

a. contributes to most of the total osmotic pressure of the plasma. ( )
b. contributes more than other plasma proteins to the viscosity of the blood. ( )
c. is markedly decreased in chronic liver cirrhosis. (✓)
d. is responsible for 50% of the buffering power of the blood. ( )

Regarding iron deficiency anemia, the following is true, EXCEPT:

a. it may occur in patients undergoing partial gastrectomy removing fundus and body. ( )
b. it is frequenctly observed in cases of chronic bleeding. ( )
c. it is more common in women than men of the same age. ( )
d. RBCs have short life span. (✓)

Vitamin B12 deficiency:

a. may result from disease of the upper part of small intestine. ( )
b. may result in atrophy of the gastric mucosa. ( )
c. causes anemia with RBCs having MCV > 95 μ^3. (✓)
d. is accompanied by prolonged coagulation time. ( )

Erythropoiesis all are correct except:

a) Needs healthy kidney which is responsible for formation of 15% of erythropoietin
b) Needs vitamin B_{12} which is important for DNA synthesis and cell division
c) Is stimulated at high altitude due to O_2 deficiency
d) Is decreased in cases of bone marrow depression by irradiation (a)

It is correct to say that:

a) Fat soluble vitamin absorption increases in complete bile duct obstruction
b) Vitamin C deficiency does not effect blood stasis
c) Vitamin B_{12} deficiency causes macrocytic anemia and peripheral neuropathy
d) Vitamin K^+ deficiency causes vision problem
e) Edema is not a feature in thiamine deficiency (C)

1- **Erythropoietin**

a- is mainly formed in the liver
b- is formed by the kidneys during ascent to high altitude
c- helps the formation of WBCs
d- is a lipoprotein (b)

- **Lymphocytes**

a- have phagocytic activity
b- constitute 10% of the total leucocytic count
c- are converted to macrophages in response to antigens
d- of B type, differentiate into plasma cells when activated by antigen (d)

(8)

vitamin B_{12} deficiency
a) is accompanied by neurological manifestation
b) causes anemia with RBCs having MCV < 80 μ^3
c) may result in atrophy of the gastric mucosa
d) may result from disease of the upper part of small intestine

A

hemolytic disease of the new born
a) presents with jaundice appearing 7 days after birth
b) is likely to occur if the mother is Rh+ve and newborn is Rh+ve
c) can be treated by exchange transfusion of group O , RH +ve blood to affected the baby
d) can be treated by giving the mother anti-D antibodies immediately after first delivery

D

Histamine is released in allergic reactions by :
a) binding of Ig M to basophils
b) binding of Ig E to mast cells
c) helper T-lymphocytes
d) free radical stimulation of endothelial cells

B

Lymphocytes
a) all originate from the bone marrow after birth
b) convert to monocytes in response to antigens
c) interact with eosinophils to produce platelets
d) are part of the body's defense against cancer

D

Active complement produces all the following effects, **EXCEPT** :
a) activation of macrophages
b) opsonization of bacteria
c) an increase of capability pérmeability
d) agglutination of bacteria

A

19-Which of the following statements about monocyte is correct?
a)It is converted into macrophage in an inflamed tissue
b)It is more active in the blood than in the attacked tissue
c)It is produced in the adult by the liver
d)It is not accumulate outside the circulation in an area of inflammation
e)It is classified as a granulocyte

(a)

20-The active complement system has the following effects:
a)neutralize viral toxic sites
b)Inhibits phagocytosis and chemotaxis
c)Stabilize lysozomes and prevents release of their enzymes
d)Sets free hydrolytic enzymes from granulocytes

(a)

)) which type of white blood cells would be elevated in mumber in cases of parasitic infestations?
a) neutrophils. ☐
b) monocytes ☐
c) Eosinophils. ☒
d) T-lymphcytes. ☐

:) What causes release of histamine in allergic reactions ?
a) binding of IgM to basophils . ☐
b) binding of IgE to mast cells . ☒
c) release by T helper cells . ☐
d) endothelins acting on vascular smooth muscle . ☐

Concerning vitamin B12

a- extrinsic factor helps its absorption

b- in deficiency ,the mean corpuscular volume is between 80-90 cubic micron

c- pernicious anemia occurs following removal of terminal ileum

d- deficiency can cause neurological manifestations ( )

Concerning erythoblastosis fetalis :

a- it can't occur in the first born child

b- it occurs as a consequence of transplacental passage of IgM

c- the affected newborn presents with jaundice and anemia

d- can be prevented by injection of the mother by anti-D antibodies during last month of pregnancy ( )

Regarding haemostasis

a) hemophilia A is due to deficiency of Christmas factor

b) thrompocytopenic purpura occurs if the platelet count is below 50,000/mm^3

c) vitamin K deficiency leads to prolongation of the bleeding time

d) vitamin B_{12} deficiency leads to prolongation of coagulation time

B

The hormone erythropoietin

a) regulates the production of erythrocytes, thrombocytes and granulocytes

b) acts on reticulocytes to convert them to erythrocytes

c) stimulates the maturation of stem cells to proerythroblast

d) increase the life span of erythrocytes

C

Iron absorption

a) occurs in the terminal ileum

b) is higher for Fe^{+2} than Fe^{+3} ions

c) depends on glycoprotein factors secreted by the oxyntic cells

d) is increased by high alkalinity of the intestinal contents

B

- Regarding erythrocyte production, all the following statements are true, Except:

a) It takes place normally in the bone marrow of long bones during adult life.

b) May be reduced in chronic renal failure.

c) May slow down following gastrectomy.

d) May be stimulated by reduction in arterial O_2 content. ( )

-Immunoglobulins:

a) Of the A class can cross the placenta.

b) Of the M class have 10 antigen-binding sites per molecule.

c) Consist of light and heavy peptide chains linked by hydrogen bonds.

d) Of the IgG class act as anti-ABO agglutinins. ( )

-At physiological PH, plasma proteins:

a) Are anions.

b) Move towards the cathode during electrophoresis.

c) Are only found in the vascular space.

d) Are all globulins. ( )

Regarding hemoglobin:

a) its normal amount in 100 ml blood is 20 mg/dL
b) fetal hemoglobin is composed of 2 α-chains and 2 β- chains
c) each molecule contains 4 Fe^{+++} atoms
d) in sickle cell anemia: Hb precipitates inside RBCs at low O_2 tension (D)

Deficiency of factor VIII coagulation factor:

a) is due to an abnormal gene on the Y chromosome
b) increases the bleeding time
c) affects the intrinsic, rather than the extrinsic pathway for blood coagulation
d) causes thrombocytopenic purpura (C)

The affinity of hemoglobin for oxygen is increased by :

a) increased $[H^+]$.
b) increased concentration of 2 , 3-DPG in RBCs .
c) carbon monoxide poisoning .
d) rise of blood temperature. (C)

The following conditions might cause normochromic normocytic anemia, EXCEPT :

a) glucose-6- phosphate dehydrogenese deficiency .
b) chronic bleeding peptic ulcer .
c) atomic radiations .
d) incompatible blood transfusion . (B)

- **Incompatible blood transfusion results in all of the following EXCEPT :**

a- jaundice
b- joint pain due to capillary blockage
c- cardiac arrhythmia due to hypecalcemia
d- renal failure (C)

Cell-mediated immunity is considered as:

a)B lymphocyte immunity
b)Both B and T lymphocyte immunity
c)Innate immunity
d)Reticulo-endothelial system
e) T lymphocyte immunity (e)

17-About iron metabolism which is correct:

a)60% of iron is present in enzymes
b)Iron is absorbed mainly in the F^{++} state
c)Iron is stored mainly in the bone marrow
d)Iron is stored in the form of transferrin
e)Iron is absorbed in small intestine by simple diffusion (b)

9-Which of the following is correct?

a)The release of tissue factor III occurs in the intrinsic pathway of blood coagulation

b)Hemophilia is a bleeding disorder caused by deficiency of factor VIII

c)The primary response (antibody response) is more potent than the secondary response

d)The primary response (antibody response) is more rapid than the secondary response

e)Both primary and secondary responses occur upon the exposure to antigen

16-A patient presents with a platelet count of 275 x 10^3/mm^3 and a bleeding time of 5 minutes. What is the diagnosis?

a)Decreased platelet production

b)Defective platelet function

c)Increased platelet production

d)Normal platelet function

10-Which of the following is correct?

a)Protein C is a clotting factor

b)Fibrin threads are soluble

c)Plasma cells originate from T lymphocytes

d)Immunoglobulins are produced by T lymphocyte

e)The clotting factor prothrombin activator is an enzyme

22) Which of the following substances can not prevent coagulation when added to a blood sample ?

a) heparin .

b) dicumarol .

c) citrate .

d) oxalate .

In obstructive jaundice, the coagulation disorder observed is:

a)Deficiency of factor XII

b)Deficiency of factor VIII

c)Longer bleeding time

d)Longer coagulation time

25) Deficiency of factor VIII (antihemophilic globulin) :

a) increases the bleeding time .

b) is due to abnormal gene on the Y chromosome .

c) causes small petechial haemorrhages into the skin .

d) affects the intrinsic , rather than the extrinsic pathway for blood coagulation .

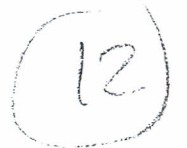
Thrombocytopenic purpura is characterized by all of the following, EXCEPT:

a. subcutaneous small hemorrhages (petechiae).

b. coagulation time more than 10 minutes.

c. decreased platelet count to less than 50000/ μL.

d. spontaneous bleeding from the mucous membranes.



'latelets are concerned with secretion of:

a) Thromboxane A_2
b) PAF that promotes healing of wounds
c) Erythropoietin hormone
d) All blood clotting factors except factors VIII and XIII

Coagulation time will be prolonged in a patient who have :

- thrombocytopenia
- anemia
- obstructive jaundice
- splenectomy

Lysis of blood clot can be produced in recently diagnosed myocardial infarction by injection of:

a. human tissue plasminogen activator.
b. heparin.
c. dicumarol.
d. vitamin K.

t is correct to say that:

a) Prothrombinase (prothrombin activator) converts prothrombin into thrombin
b) Thrombin converts plasminogen into plasmin
c) Platelets secrete clotting factor III
d) Heparin is a coagulant factor
e) Basophils are phagocytic cells

18-About the platelets functions, what is the correct:

a)Platelet adhesion which depends on serotonin
b)Platelets aggregation which depends on ATP
c)Platelets clot retraction which depends on ADP
d)Platelet fusion by ADP and enzymes

40-What condition leads to a deficiency in factor IX that can be corrected by an intravenous injection of vitamin K?

a)Classic hemophilia
b)Hepatitis B
c)Bile duct obstruction
d)Genetic deficiency in antidirombin III

( )

All the following conditions are accompanied by excessive bleeding EXCEPT :

a- hemophilia.
b- thrombocytopenia.
c- Liver failure.
d- Vitamin B12 deficiency.

Regarding the fibrinolytic system, the following statements are true EXCEPT:

a- plasmin is formed from plasminogen by the action of tissue plasminogen activator.
b- Active protein C inactivates factor XI and X.
c- Plasmin lyses fibrin and fibrinogen into fibrin degradation products.

d- Streptokinase and urokinase have fibrinolytic effect and are used to treat early myocardial infarction.

Vitamin B_{12} absorption :

a) occurs in the terminal ileum by simple diffusion .
b) is dependent on presence of vitamin C in diet.
c) depends on a glycoprotein secreted by the antrum of the stomach .
d) is decreased in pernicious anemia . (b)

Concerning erythroblastosis fetalis, the following statements are true, EXCEPT :

a) it is the result of ABO system incompatibility .
b) it occurs if anti-D agglutinins are formed in the maternal blood before the first pregnancy.
c) it may result in brain damage due to rise of bilirubin level in the blood.
d) An exchange blood transfusion can be made at a rate of 175 ml/ kg. body weight. (a)

·Regarding iron deficiency anemia , the following is true, EXCEPT :

a) it is frequently observed in cases of chronic bleeding .
b) may occur in patient undergoing partial gastrectomy removing fundus and body .
c) it is more common in women than men of the same age .
d) RBCs have MCV ≥ 90 M. (d)

Incompatible blood transfusion results in all the following, EXCEPT:

a) joint pain due to capillary blockage .
b) cardiac arrhythmia due to hypercalemia.
c) hypotension and shock due to release of vasodilators from agglutinated RBCs.
d) renal failure due to blockage of the renal tubules by agglutinated RBCs. (b)

Bleeding time is usually prolonged in:

a) Hemophilia
(b) Thrombocytopenia
c) Anemia
d) Polycythemia
e) Leucopenia ( )

11-What occurs following presentation of antigen by an infected cell?

a)Generation of antibodies
b)Activation of cytotoxic T cells
c)Increase in phagocytosis
d)Release of histamine by mast cells (b)

4) Vitamin B_{12} deficiency may :

a) cause atrophy of the gastric mucosa . ☐
b) result from disease of the terminal ileum . ☒
c) cause pathological changes in the central nervous system . ☐
d) result in anemia with small RBCs (microcytic) . ☐

Homework Autonomic (1) (7)

1) Define Ganglia, describe the autonomic ganglia regarding its importance & its types

2) Give an account on:

a- Sympathetic supply & function for head & neck

b- sympathetic supply & functions for thoracic viscera

c- sympathetic supply & functions for abdominal viscera

d- Sympathetic supply & functions for Pelvic viscera

3) Discuss the origin, course, relay, functions of:

a- greater splanchnic nerve

b- Lesser splanchnic nerve

I

Homework Autonomic (2)

1) Give an account on :
Parasympathetic supply & function of :
a- Head & neck
b- Thoracic & abdominal viscera
c- Pelvic viscera

2) Describe the role of vagus & pelvic nerves in autonomic regulation of viscera

3) Discuss the autonomic supply & function of :
a- Head & neck
b- Thoracic & abdominal viscera
c- Pelvic viscera
(autonomic = symp & parasym)

4) Enumerate the sites of release of acetylcholine & describe its cholinergic receptors

5) Enumerate the sites of release of norepinephrine & describe its adrenergic receptors

6) Describe the changes occuring in our body during stress (Alarm Response)

Parasympathetic

(1) (a) (2) (b)

Name chemical transmitter released at (1)

Name chemical transmitter released at (2)

Name the type of receptor (a)

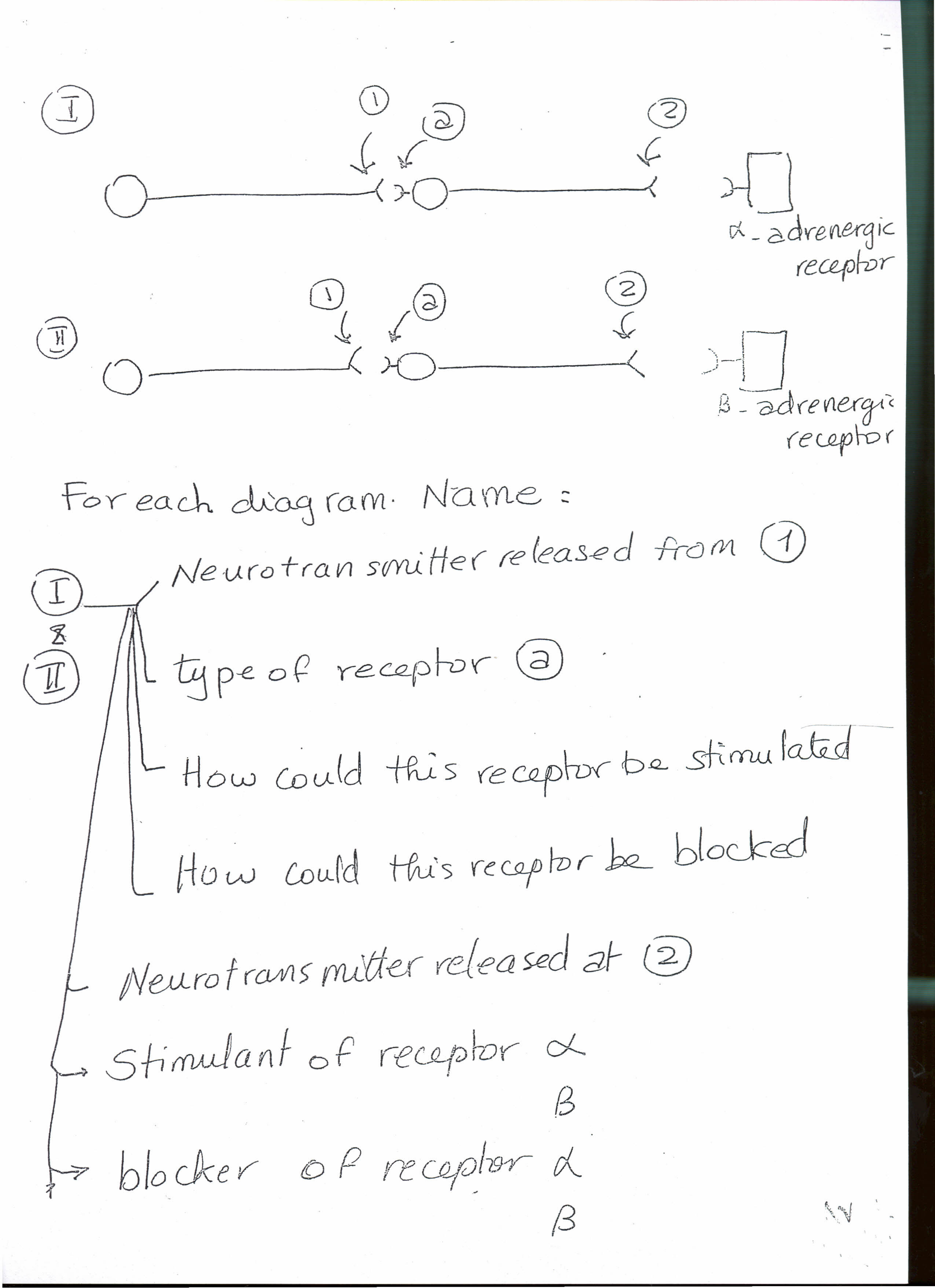
How it could be stimulated

How it could be inbited

Name the type of receptor (b)

How it could be stimulated

How it could be inhibited



I
1
a
2
α - adrenergic receptor
II
1
a
2
β - adrenergic receptor
For each diagram. Name :
Neurotransmitter released from 1
I & II
type of receptor a
How could this receptor be stimulated
How could this receptor be blocked
Neurotransmitter released at 2
Stimulant of receptor α
β
blocker of receptor α
β

Homework nerve

1) Draw Strength-Duration Curve & discuss the factors affecting the effectiveness of stimulus. Define Rheobase, Utilization time, Chronaxie
2) Draw the action Potential of a nerve & discuss the ionic basis of this electrical change
3) Discuss Nernest & Goldman equations and clarify their role in determination of the role of Na^+, K^+, & Na^+-K^+ pump in resting membrane potential.
4) Define local response. Compare it to AP
5) What are the factors affecting the excitability of a nerve?
6) What are the excitability changes occuring during nerve stimulation - what are their causes?
7) Describe the mechanism of propagation of AP in myelinated & unmyelinated nerve

Homework Muscle

1) Give an account on the mechanism of contraction of skeletal muscle.

2) Describe the events occuring at neuromuscular junction. & discuss its properties.

3) Compare between isometric & isotonic contraction

4) Give an account on:
   - (a) length - tension relationship of sk. ms.
   - (b) Load-velocity relationship of sk. ms

5) Describe the factors responsible for grading of skeletal muscle activity

7) Discuss in details the mechanism of contraction of smooth muscle

8) Describe the properties (characters) of smooth muscle contraction & factors regulating it

9) What are the electrical properties of smooth ms. and Compare between different types of smooth ms

Homework Blood (2)

1) Name the most important vitamines affecting erythropoeisis. Describe their role & the effect of their deficiency

2) Describe the mechanism of Vit B_{12} absorption
What type of anemia its deficiency causes?
Enumerate the causes of its deficiency

3) What type of anemia the deficiency of iron causes? Enumerate the causes of its deficiency

4) Describe the role of platelet in hemostasis.
Give an account on platelet function
Describe the mechanism of platelet plug formation
Discuss the events occuring during platelet release reaction

5) Describe the intrinsic Pathway of coagulation.

6) Describe the extrinsic Pathway of blood coagulation & explain its role in clot formation
(interaction between intrinsic & extrinsic)

7) Classify the coagulation factors. What are the characteristics of each group?

8) Describe the general & specific anticlotting mechanisms

9) Give an account on fibrinolytic system

10) Discuss the activation of fibrinogen & fibrin clot formation

Parasympathetic

Name chemical transmitter released at ①

Name chemical transmitter released at ②

Name the type of receptor ⓐ

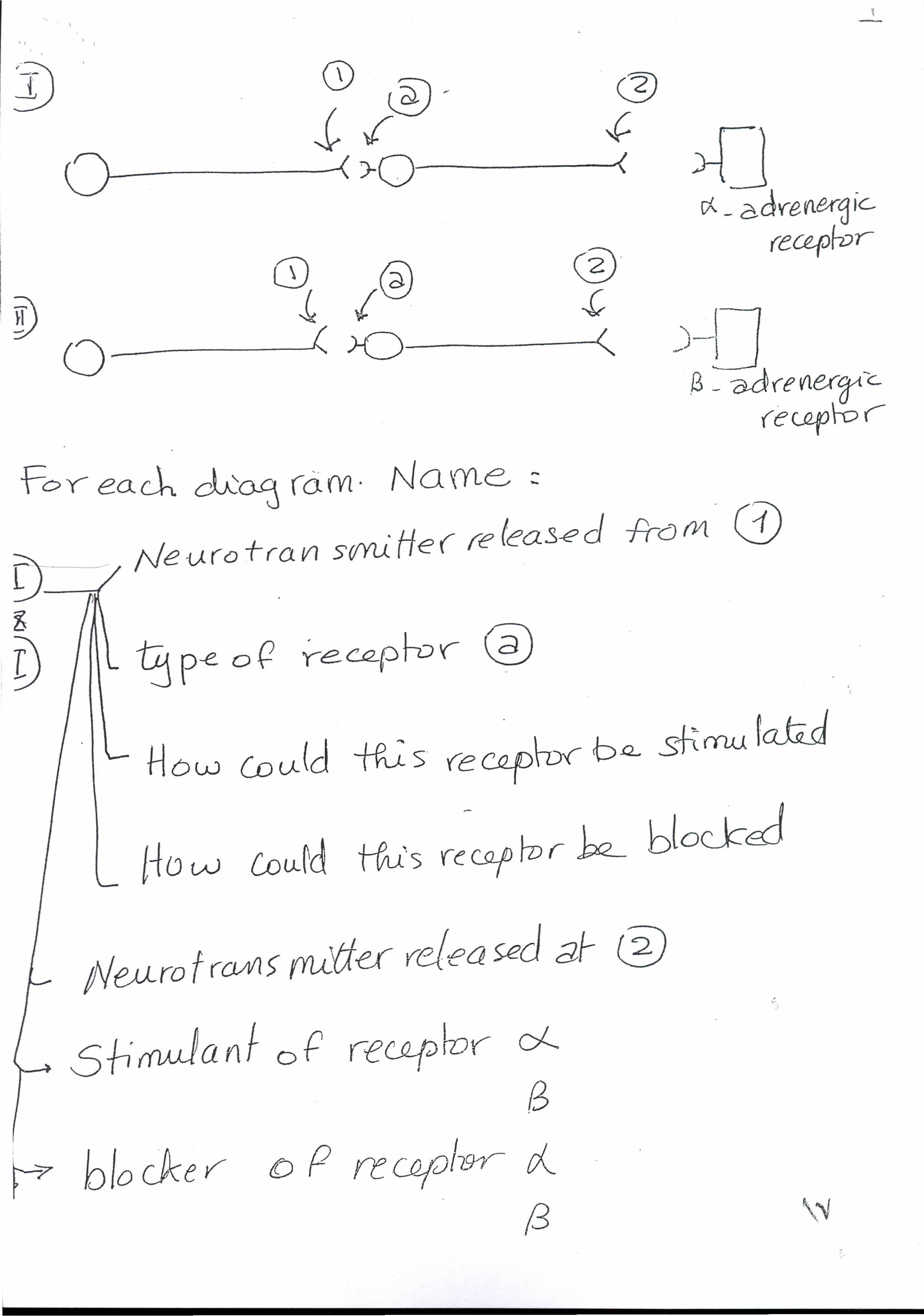
How it could be stimulated

How it could be inbited

Name the type of receptor ⓑ

How it could be stimulated

How it could be inhibited



I
1
a
2
α - adrenergic receptor
II
1
a
2
β - adrenergic receptor
For each diagram. Name :
I & II
Neurotransmitter released from 1
type of receptor a
How could this receptor be stimulated
How could this receptor be blocked
Neurotransmitter released at 2
Stimulant of receptor α
β
blocker of receptor α
β

Homework Blood (1)

1. Discuss the functions of plasma proteins
2. Enummerate the factors affecting the rate of erythropoeisis & discuss in details the role of erythropoeitin
3. Give short account on:
   a- Iron absorption
   b- Vit B_{12} absorption
   c- Regulation of iron absorption